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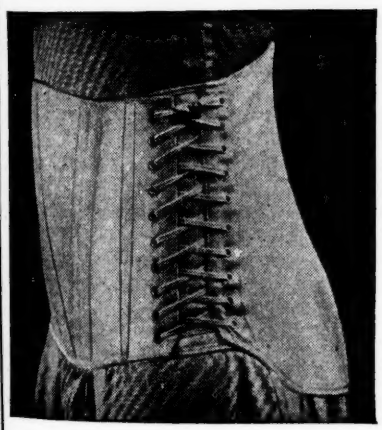

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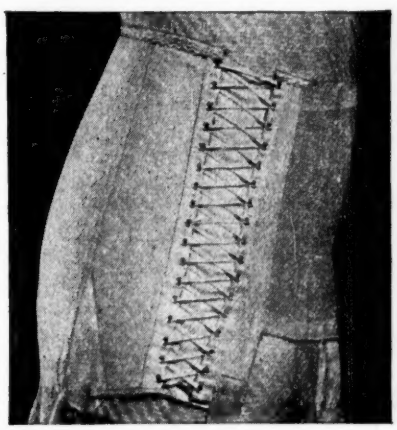

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The next Annual Meeting of the Massachusetts Medical Society will be held in Worcester, at the Hotel Bancroft, Monday, Tuesday and Wednesday, June 4-5-6, 1934.

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DENTAL HEALTH: A PROBLEM IN NUTRITION*

BY JOSEPH GARLAND, M.D.†

AN attempt at bringing to a group of clinicians and investigators in the dental sciences any significant message as to the development of the teeth, the factors which determine their occlusion and their continued integrity, the influences which bear upon their health and their diseases, would seem too much, I am afraid, like carrying coals to Newcastle. Rather should we in the kindred science of medicine, and particularly in pediatrics, who are searching for means to preserve general health, sit at the feet of the dental profession and learn what it has to teach us. Nevertheless the problem of dental health is with us, it is as yet hardly solved, and it does not seem as if, in the light of our present accomplishments, any single group of workers is to be capable of attaining the millennium alone. If results are to be commensurate with the importance of the task they must be achieved through a coöperative effort by the practitioners of dentistry and of medicine and by the investigators in both branches of science.

Dental caries, certainly the most important division of the dental problem, has followed the march of civilization and may logically be considered as largely the result of abnormal nutritional conditions. Where life is primitive and uncomplicated, save for the natural hazards of existence, and is maintained on an adjacent food supply; unattractive, perhaps, to a cultivated palate but nevertheless apparently suited to the environmental conditions which prevail, dental caries is rare or nonexistent. Where the problem of food supply has become complicated by the necessity of processing, of preserving, of transportation and of storage; where these factors and the equally important factor of acquired tastes and appetites have altered the dietary habits of a people, an increase in dental decay has been one of the penalties to be suffered.

History is full of these penalties which we have paid for the comforts and conveniences of civilization and the over-organization of the art of living. The very means which we have developed for protection against one hazard or merely one discomfort has brought two others down upon us. Our appetites and our genius for satisfying them have betrayed us. The ease of manufacturing goods which brought on the industrial changes of the eighteenth century with their mobilization of the working classes into towns and cities, brought with them also a tidal wave of rickets which swept over Europe and later into America and is only now subsiding; still earlier the convenience of city living for great numbers of the population was largely responsible for famine and pestilence; the early argosies of commerce and of exploration, eager to extend still farther the limits of their world carried with them the seeds of scurvy; the Oriental coolie, employing the methods of civilization on a primitive diet has fallen a victim to beriberi by the simple device of polishing away the life-protecting properties from his staple article of diet; the Danish farmers during the World War exported for profit the products of their dairies and bartered the eyesight of their children for foreign gold.

To lengthen the list would be to embark upon a tedious recital. For the conveniences of a mechanical civilization we are sacrificing our nervous stability; for the comforts of steam heat we are sacrificing our resistance to infection; for ease of transportation, luxury in reclining and smoothness in walking we are sacrificing our body mechanics and our plantar arches, and for palatal stimulation, speed in eating and ease in mastication we are sacrificing our teeth and our dental arches!

It is mainly with the manner in which our dietary habits affect our dental structure that we are interested, but we must look at the problem from as broad a point of view as possible, remembering that varying conditions of health may leave their records upon the teeth as upon the bones and remembering that in general, nutrition depends upon the teeth almost as much as the teeth depend upon nutrition. No offence need be taken by the dental hygienist—none is offered—when we cast doubts upon the permanent value of his or her efforts in scraping, cleaning, filling, polishing and possibly simonizing the teeth which are brought in for their periodic overhauling. It is usually doing the best that can be done with the material offered. It is, however, as McCollum[1] says, essentially trying to put an attractive superstructure upon a faulty foundation, and the same author is responsible for recalling the words of an eminent dentist who recently made the assertion that most of the sound teeth in the world existed before the tooth brush was invented. So much for the slogan that a clean tooth never decays.

The prevalence of dental caries constitutes a

*Read before the American Academy of Dental Science, December 6, 1933.

†Garland, Joseph—Physician to Children's Medical Service, Massachusetts General Hospital. For record and address of author see "This Week's Issue," page 602.

very definite challenge to the progressive forces of science, its incidence being variously estimated; eighty per cent of the school children of this country by Holt[2], ninety-six per cent by Cross, quoted by McCollum, who presents the analogy that ninety-six per cent of the children coming here from the southern part of Europe have sound teeth.

Primitive peoples, or peoples living in surroundings to which they have become habituated by centuries of residence, on diets relatively unchanged, are usually comparatively free from major dental defects. McCollum gives various examples to illustrate this point. Catlin in the mid-nineteenth century examined the skulls of many Sioux Indians and was struck with the exceptional completeness and soundness of their beautiful sets of teeth, of all ages, which also showed a total absence of malformation. The chief of a party of fourteen Iowa Indians who visited London with him informed him "that one of the most striking peculiarities which all Indian tribes discovered amongst the white people was the derangement and absence of their teeth, and which they believed were destroyed by the number of lies passing over them." Hrdlička in 1908, on the other hand, reported dental caries to be not rare among Indians of the southwestern United States, though much less frequent than among the whites.

The teeth of the Eskimo, as a whole, are found by Hrdlička to be probably the best of any large group of people living today, although other observers have noted that Eskimos living in contact with trading posts begin to show signs of dental caries. Sixty-eight per cent of Igorot children in the Philippine Islands have been found to have perfect teeth, with the imperfections in the remaining thirty-two per cent so slight that they would have escaped notice if casually inspected. The Highlanders of Scotland, living on a simple diet of natural foods, are comparatively free from dental decay while the Lowlanders, subsisting on a more refined diet, have much decay. Howe[1] notes that "every dentist is familiar with the fact that many of the Swedish girls who come to this country as domestics have excellent teeth when they arrive, but after eating our refined and cold storage foods their teeth rapidly decay."

Abnormalities of dentition, however, are not peculiar to modern times either in France, England or Egypt, and Ruffer[1] doubts whether there was ever an epoch in these countries when the human species was not cursed by toothache. Prehistoric remains in England show great abnormalities in the position of the teeth, and excavations at the Giza pyramids brought to light many skeletons of the aristocrats of ancient Egypt showing that tartar formation, dental caries and alveolar abscesses were at least as common as they are in modern Europe, in sharp contrast to the poorer people of that time, who were relatively immune to dental disease. Another advantage which the Israelites had over the Pharaohs, and a very tangible one, is thus demonstrated.

In the Hawaiian Islands, Sullivan and Chappel[1] examined prehistoric skulls, many of them dating back before the invasion of the whites in 1778, and found that nearly all belonging to individuals over forty years of age showed gingival caries. This was attributed to the low calcium and phosphorus content of poi, the principal food of the Hawaiians, derived from taro root. Jones, Larsen and Pritchard[3] and Hess and Abramson[4] have more recently commented on the susceptibility to dental decay of Hawaiians, Jamaicans and other tropical races in contrast to the Eskimos, finding in this susceptibility an argument against any close relationship between dental caries and rickets, the latter being a rare condition amongst these peoples.

It is well known that Negroes tend to have better formed, better placed and more resistant teeth than white people, a belief that is borne out by a communication to McCollum[1] from Dr. P. S. Schenck, relative to the teeth of white and colored children of Norfolk, Virginia. Here a much smaller percentage of Negro than white children were found to have dental defects, a fact attributed to the habit of feeding the Negro children, as soon as they can eat solid foods, large quantities of greens, cabbage, turnip salad and other vegetables. They do not have the sugars and refined foods which the white child eats, and consequently their diet contains a larger percentage of lime, iron and other salts.

Dr. J. A. Murphy[1], on the other hand, reported that in Washington, D. C., 83.4 per cent of the white as opposed to 88.3 per cent of the colored children had carious teeth, the average number of cavities in temporary teeth of white children being 0.6 as compared with 1.0 for the colored children, and 1.3 in the permanent teeth of the white as compared with 2.3 for the colored. The diets are not mentioned in this communication, but the facts suggest that the usual superiority of the Negro's dental structure may be as much an environmental as a racial characteristic.

As has been said before, it is the teeth with which we are mainly interested at the moment, but our interest embraces the fact that the teeth are living parts of a living body, frequently flourishing as it flourishes and suffering as it suffers. They are indices, sometimes the only obvious ones, of the general state of nutrition, but too frequently their ill health or their faulty position accompanies obvious "skeletal defects, defective musculature, anemia, faulty posture, and other evidences of malnutrition, revealing the fact that a large percentage of our children are not properly developed, and in many cases for lack of a properly planned dietary".

Mummery[5], in his excellent report to the Medical Research Council in 1922, summarized the early investigations that had been conducted on the pathogenesis of dental caries. The first experiments on the artificial production of caries were performed in 1867 by E. Magitot of Paris, who believed that caries was a purely chemical process. Where the reaction was alkaline no alteration was found in extracted teeth which were kept in a solution for two years; in an acid solution the whole tooth softened and became black. Prior to these experiments, before the introduction of porcelain teeth, ivory dentures had been used; in some subjects these were found to remain unaffected, while in others they were rapidly destroyed.

Milles and Underwood next, in 1882, incubated teeth in a mixture of bread, saliva and meat, with no changes resulting in the teeth. The mixture, however, was not changed and became putrescent and alkaline; no acid being present there was no action on the teeth. Two years later, in 1884, W. D. Miller laid the foundations for a more modern conception of caries by causing natural cavities to occur in extracted teeth by placing them in a mixture of bread and saliva which was frequently changed and not allowed to become alkaline. Acid alone, it was believed as a result of these experiments, will cause decalcification and a uniform softening of the dentin; decalcification, plus the action of bacteria, causes carious cavities. Mechanical agencies were also recognized; imperfect formation of the enamel leading to its early destruction, and ridges and prominences which are easily broken off, exposing the dentin surface.

In 1922, the same year in which Mummery made his report, Grieves[6] considered the subject from the point of view of calcium, phosphorus and the organic substances existing in cod liver oil, concluding that, as with rickets, the actual amount of calcium and phosphorus in the diet is less important than the ratio existing between the two. He also noted that the acid ash seems to increase the tendency to the lesion. Howe[7], beginning his bacteriologic studies in 1914, made note also of the similarity in structure and chemistry of teeth and bones and found that animal experimentation does not support the former belief that carbohydrate material adhering to the teeth fermented with the formation of lactic acid, and resulted in the cavities of tooth decay. Guinea pigs fed on a diet to which large amounts of sugars, dextrin and white flour were added showed no dental defect at the end of a year. Moreover, in osteomalacia and rickets the calcium, phosphate and carbon dioxide ratio is not altered, as it would be if the bone-earth were removed by an acid. Many decayed teeth, however, have shown a great increase in magnesium, which also takes place when scurvy is induced. Howe concluded that calcium was the most important mineral factor, serving to regulate the equilibrium in almost any irregularity of the body mineral elements. The antiscorbutic factor is necessary, however, or the organism will withdraw calcium from the teeth and parts of the bone.

The Mellanbys have attacked the problem from a somewhat different angle. According to May Mellanby[8], diet influences the formation of teeth in three ways. a. The calcifying vitamin D increases and seems to control the actual calcifying process; b. cereals act in the opposite way and specifically interfere with tooth calcification; c. sufficient calcium and phosphorus must be included in the diet, the minimum requirements depending largely on a. and b. Irradiation acts like vitamin D. Actually those cereals containing the most calcium and phosphorus are worst for the teeth, notably oatmeal and wheat germ, although if oatmeal is boiled for an hour and a half in a one per cent hydrochloric acid solution, so that the starch is converted to dextrose, it loses its power of interfering with calcification. The question is raised as to whether this may be due to the destruction of an anticalcifying agent. Most natural food mixtures, Mellanby believes, contain enough calcium for the production of perfect teeth providing sufficient vitamin D is included.

She agrees with Howe that vitamin C deficiency leads to decalcification as with the bone changes in scurvy.

Edward Mellanby[9], as did Howe, remarks on the similarity in chemical composition between teeth and bones, and expresses his belief that dietetic conditions which determine the formation of good and bad teeth are similar to those controlling bone formation. "Substances," according to his conclusions, "tending to produce perfectly calcified, bright, shiny and evenly arranged teeth include milk, egg yolk, cod liver oil, or indeed substances rich in vitamin D, while cereals in the absence of sufficient vitamin D produce defectively calcified, dull and discolored, unevenly arranged teeth." He finds about a ten per cent exception to the general rule that poor dental structure predisposes to caries, and asserts that a well-formed tooth becomes carious because the dietetic conditions have changed since the tooth was originally formed; on the other hand a poorly formed tooth becomes more resistant to caries if dietetic conditions have improved and secondary dentin is formed.

Marshall[10] feels that the chemico-parasitic theory of Miller does not correlate all of the clinical facts, as in failing to explain the comparatively rare condition of "immunity". He believes that diet plays only a part in the problem and that local conditions as controlled by

saliva and as modified by the oral flora are still important factors in the etiology.

He cites five factors in the causation of caries:

1. Anatomic causes; the position of the teeth in the arch in relation to occlusion and contact, also the presence of faults of development such as are considered under the term of hypoplasia.

2. Bacteriologic, also having to do with local factors; a thread-like organism, as typified by Cladothrix placoides and Leptothrix buccalis, fastens to a convenient tooth surface and a bacterial plaque commences, which B. acidophilus finds a suitable place for growth.

3. The condition of the saliva, providing a favorable environment for bacterial activity.

4. The glands of internal secretion, about which little is known, particularly in this relationship.

5. The diet, especially in relation to calcium metabolism and the vitamins.

Tucker[11] doubts whether the decalcification and conditions simulating natural caries produced by the experiments of Miller and others are identical with natural caries, believing that if bacteria are the cause of dental caries, more than one type of acidogenic organism is concerned in the process. In his own experiments on children fed on standard diet with and without orange and lemon juice, although Lactobacillus acidophilus was found most frequently and most consistently in the mouths of children whose teeth contained three or more cavities, it was not always found even in those cases in which there was shown to be a high susceptibility to caries. The organism also occurred rather frequently and consistently in the mouths of children who had never had any caries, or who had developed no new lesions for two years. L. acidophilus is therefore not an obligate producer of dental caries and the experiments indicate that its association with caries is secondary rather than primary.

Howe[12] has arrived at the same conclusions, and believes that the cause of caries will be found in the nutritional field, resulting in some way from the process of calcification, probably as it is influenced by vitamin C.

The value of orange juice in arresting caries, Kugelmass and King[13] believe, is due not merely to its vitamin C content, but also to its alkali-forming composition. These authors rather logically conclude that the ill effects of high carbohydrate feeding are due to the diminution in the dietary of more important nutrients rather than to the harmful effect of the carbohydrate itself and attach the greatest importance to the base-forming attributes of the diet. They point out that the development of the teeth begins in intra-uterine life with the deposition of lime salts in the deciduous teeth at about the sixteenth week, and that the nutrition of the mother hardly influences the teeth of the fetus, because embryonic tissue possesses enough growth impulse for nutrition at the expense of the mother unless the maternal malnutrition is extreme.

Jones, Larsen and Pritchard[3], in their Hawaiian study, previously mentioned, indicate that in Hawaii odontoclasis occurs in the newly erupted teeth of a high percentage of island-born infants, although most of these babies are breast fed and rickets is rare. They point out that the formation of enamel and of dentin in the unerupted teeth do not parallel each other, but that the formation of bone and of dentin do, enamel being an epithelial, ectodermal tissue while bone and dentin are connective, mesodermal tissues. They suggest, that, under certain conditions, those factors which accelerate calcification in the long bones actually increase the liability of enamel to decay, and vice versa. An imbalance may be assumed to exist, they believe, based perhaps on the fact that rickets occurs on an alkaline diet and heals when organic acids are added to the diet; the latter condition being one which is most unfavorable for the formation and preservation of the enamel.

Boyd and Drain[14] have made some of the most notable recent contributions to the study of caries. Although factors leading to enamel defects have been predicated as predisposing a tooth to caries, they point out that other factors must also be involved, as in the middle-aged teeth are found abraded almost to the gingival margins without evidence of active caries. Oral hygiene is admittedly not a preventive; the bacterial factor involved is probably secondary rather than specific.

These authors, in studying a group of children, found many with arrested caries. They were patients who had also salivary calculous deposits which are common in adults but rare in children, and were without exception diabetics who had been under treatment six months or more. In treating these children an attempt had been made to approximate normal metabolism, but fat was used as the chief source of energy. They were otherwise on the essentials of a complete diet with the ash predominantly basic.

According to Boyd and Drain, chemical analysis of carious teeth shows reduction of the calcium and phosphorus, and associated with the development of tooth decay a softening of the adjacent dentin. These changes, by lowering the physiologic integrity of the dentin, permit bacterial invasion to occur. Borderline states of nutritional disease conditions, they believe, must be recognized and studied in relation to the type of diet commonly employed, an analysis of these diets showing them to fall below the optimum values of mineral and vitamin adequacy.

Further observations on non-diabetic children

have also been made by Boyd, Drain and Nelson[15]. Each child studied had extensive caries, demonstrable by softness of the exposed dentin. Their diets were made similar to those given the diabetic children, but no insulin was given. Four patients were kept on this high fat regimen for two months or longer and in all the caries was arrested and the dentin hardened. Similar results were obtained with a group of children with chronic intestinal indigestion; so-called celiac disease. These patients, on account of their condition, were placed on a low fat, high protein and simple sugar diet, but caries was cured or prevented by the addition of mineral-containing foods and the vitamins.

Bunting, Hadley, Jay and Hard[16], in introducing the results of their own investigations, offer a list of the accepted characteristics of the process of dental caries. According to this, the initial stage of caries is decalcification of the hard substance of the tooth by acids which are not generally distributed in the saliva, but are localized and concentrated on certain areas of the tooth surfaces, most frequently in the pits and fissures of the occlusal surfaces and on certain areas of the approximal, buccal and lingual surfaces where there are opportunities for stagnation and the retention of foreign matter.

All initial lesions of caries contain acid-forming bacteria.

The hardness or softness of teeth may affect the rate of progress and extent of caries, but does not alone determine its occurrence.

Malhygiene of the mouth frequently favors the inception of dental caries, but alone does not determine its occurrence.

The process of dental caries is related to and often determined by certain imperfectly understood constitutional states and conditions of bodily health. These are as follows:

1. Heredity.
2. Age, the susceptibility being greatest during the ages from seven to twenty years.
3. Health, severe onsets of caries following attacks of general disease and occurring during pregnancy and in undernourished or debilitated children, and
4. Racial Influences.

The acid theory and the importance of bacterial flora are definitely favored by these observers, who believe that the acid attack takes place beneath an enveloping film or plaque which protects the acids of caries from dilution and neutralization by the saliva. Unlike Tucker, they found an acidogenic and aciduric organism, apparently identical with Bacillus acidophilus, in practically every lesion of active caries, and usually failed to find it in the mouths of persons entirely free from caries. They were, moreover, able to produce carious lesions by the experimental application of B. acidophilus to teeth in the mouth.

The conclusions are that an adequate, well-balanced diet with a reduction in carbohydrate and an increase in mineral-containing foods and vitamins is inhibitive to dental caries. The same general type of diet, they find, is favored by students of caries, whether they believe that control occurs as a result of decrease in aciduric bacteria, increase of salivary alkalis or hardening of the tooth.

The manner in which an unbalanced diet may affect the welfare of fully formed teeth is discussed by Bödecker[17], starting with the premise that this process may take place by two possible methods: first, from the exterior by means of saliva, and secondly, from the interior by means of the blood. He supports the latter view by indicating that the teeth are vital organs with a nutritive supply from the blood in the dental pulp, the principal elements of nutrition being mineral salts and possibly fat. Mummery[5] had previously demonstrated the organic nature of enamel by showing its permeability to stains.

Bödecker describes in detail the physiology of dental nutrition, the nutritive fluid of the teeth, or dental lymph, originating in the blood of the dental pulp and being secreted by the odontoblasts of this organ. From each of the single layer of odontoblasts covering the pulp surface a long tubelike dentinal fibril passes into the dentin and ends in forked branches which presumably transmit the dental lymph to the organic or protein structures of the enamel. The principal structures in the enamel which take up the lymph from the terminal branches of the dentinal tubules are the tufts, the enamel rod sheaths and the enamel lamellae.

The dental lymph acting in this manner has possibly three functions in the teeth of the child and young adult: first, to complete the calcification of newly erupted teeth by furnishing mineral salts and fats: secondly to act, by its mineral content, as a buffer against external, destructive acids, and thirdly, possibly to discourage the growth of aciduric organisms in the mouth.

Bödecker's conclusions are that the exciting cause of dental decay is probably an acid, generated by the bacterial fermentation of particles of carbohydrate food. Cleanliness is therefore essential. A predisposing cause, or causes, also exists in the nature of an abnormal constitution of the dental lymph developed by the malfunctioning of the pulp and by deficiencies of the blood. The teeth consequently possess a protective mechanism, and diet is probably the all-important factor.

Mitchell[18], writing from the point of view of the pediatrician, accepts the thesis that conditions influencing the development of bone will likewise influence the formation of the teeth, finds a rickets-caries parallelism, and urges the balanced diet, not stressing any one factor.

The most imposing mass of evidence so far accumulated, and the most recent, makes up the

volume Diet and Dental Health by Milton T. Hanke[19], giving in detail the results of the studies carried out in the laboratories of the Otho S. A. Sprague Memorial Institute at the University of Chicago and at Mooseheart, Illinois, the City of Childhood.

Hanke, in discussing cause and prevention, discounts the importance of aciduric and acidogenic organisms, and finds that plaques may be present for years upon a completely healthy enamel surface. Places in which decay occurs are regions of stagnation and may be areas that have been subjected to strain. While he admits that decalcification of the tooth structure might be caused by such acids as are produced by bacteria in these regions, it might also conceivably be caused by the enzyme phosphatase, the presence of which in the mouth has been demonstrated. In prevention, the vitamins A, B, C, and D and the phosphates have, respectively, been held to be specific agents, and all of them are probably factors. The best results are doubtlessly obtained when a liberal, diversified diet is ingested, but there are still cases in which dental caries continues even though an excellent diet is being adhered to.

Caries is definitely associated by Hanke with scurvy and the antiscorbutic vitamin. Guinea pigs on varying degrees of vitamin C deficiency and in varying stages of the development of scurvy show proportionately retrogressive changes in pulp and dentin with altered or disappearing odontoblasts and, in a certain stage of the deficiency, with newly formed dentin free from tubules and imperfectly calcified. The conclusion can probably be drawn, he believes, that pre-scurvy, in man, can lead to changes in the pulp and dentin of human teeth similar to those determined for the guinea pig, with similar repair processes.

The main points brought out by Hanke's studies on human subjects are that considerably greater amounts of vitamin C are necessary to preserve health and prevent or cure caries than had previously been appreciated, and that other factors than the vitamin C intake determine susceptibility to the condition. Thus, while the addition of a pint of orange juice and the juice of one lemon to the daily diet has reduced the amount and the severity of the disease markedly in all cases, the incidence of caries is still greatest in those groups that had previously had the most decay.

His studies on the potency of various sources of vitamin C indicate that fresh orange juice is about twice as effective as either canned or fresh tomato juice, slightly more effective than grapefruit juice, and about the equivalent of lemon juice. Orange juice that has stood for twenty-four hours in an open vessel has not lost any of its potency. Raw cabbage is a rich source of vitamin C, but uncertain because of the speed with which the vitamin is destroyed when the juice is exposed to the air. The total daily amounts of orange juice necessary to prevent or cure caries are considerable; approximately a pint for the treatment of simple caries, running up to a quart for the cure of severe gingivitis, with at least eight ounces for a maintenance ration.

Hanke's conclusions are as follows:

1. The average American diet is adequate in calories but appears to be deficient in certain substances that are requisite to dental health. This dietary deficiency may be the ultimate cause of much of the gingivitis, pyorrhea, and dental caries with which we are afflicted.
2. Gingivitis and dental caries can occur in the majority of a large group of children who are receiving a quart of milk, one and one-half ounces of butter, a pound of vegetables, half a pound of fruit, and nearly one egg a day. These foods do not, therefore, contain substances that are specifically antagonistic to gingivitis or dental caries.
3. The addition of a pint of orange juice and the juice of one lemon to a diet that is nearly adequate in all other respects supplies something that leads to a disappearance of most of the gingivitis and an arrest of about fifty per cent of the dental caries.
4. Dental caries again becomes rampant and gingivitis redevelops in most of the cases when the citrus fruit intake is reduced to three ounces a day for one year. Three ounces is not enough.
5. Children display a definite tendency toward the development of carious lesions which is nil or low in some cases and high in others. The administration of an adequate amount of citrus fruit juice to a diet that is nearly adequate in other respects reduces the intensity of the caries process, but does not completely remove the effect of the inherent tendency in all cases.
6. Orange and lemon juice contain something that acts as a growth stimulus to children.

We see, therefore, that various theories, based upon more or less substantial evidence, have been adduced to explain the pathogenesis of dental caries; enamel defects, anatomic and developmental anomalies, local mouth condition and neglect of dental hygiene, the bacterial plaque and the rôle of aciduric and acidogenic organisms, the acid ash, mineral lacks, carbohydrate insult, and deficiencies in practically all of the vitamins, of which a vitamin C deficiency seems to play a prominent rôle.

The search for an outstanding specific factor, however, appears to have been a misleading one. Rather is it evident that the synergetic action of a constellation of factors is necessary to produce the fault and to correct it. There is no simple philosopher's touchstone which by some divine chemical process can settle the question once and for all. It is too apparent that of the tenable theories the working of one depends in some way upon the working of another. Orange

juice alone will not produce a complete cure in every case; the remainder of the diet must be considered as to its mineral and vitamin content and the reaction of its ash. The rôle of bacteria may be secondary to the type of the diet, but it must be considered as a possible contributory if not a controlling factor. The excessive use of starches and sugar may not introduce a specific damaging factor but they may contribute to the imbalance either through their acid ash or by replacing more essential food elements. We must furthermore take into consideration certain embarrassing facts which are not easily explainable; the high incidence of caries among various tropical races which partake largely of the citrus fruits, and the immunity of the Eskimos who know not the land where bloom the orange blossoms.

Least understood of all is the influence of the prenatal diet upon the development of dental caries in the young, and in any discussion of this particular problem we must avoid the pitfall which might result from a confusion of the causes of rickets and of caries. It is known that in pregnancy, especially in the last two months, at least one gram of calcium per day should be supplied in the diet in order to balance calcium excretion, whereas under ordinary conditions of life 0.45 grams is sufficient. The reason for this is that the average daily calcium retention of the fetus in this period of development is 0.456 grams per day.

Since, as we have seen, the fetus appropriates for itself whatever is needed for its bony structure and possibly for its prenatal dental development, it must draw on a preëxisting store of maternal calcium if the day by day calcium in the diet is insufficient for its needs. The best available supply of dietary calcium for the pregnant woman is found in milk, cheese, eggs, fresh fruit and green vegetables, one liter of milk yielding 1.0 to 1.1 grams of calcium, but the proper ionization and storage of this calcium should be assured so far as possible. In the darkness of our ignorance rather than in the light of our knowledge, therefore, it seems a wise precaution to ensure a reasonable intake of vitamin D, either as cod liver oil, halibut liver oil, irradiated ergosterol or in the form of vitamin D milk, and of the antiscorbutic vitamin which we have found to be usually so necessary in the prevention and cure of dental caries.

The pregnant woman, however, is an uncertain patient on whom to try dietary experimentations, and if we are to concede that on her care part of the burden of the fetal dental development is to depend, our alliance against dental disease must be triple rather than dual; the dentist and the pediatrician must enlist also the coöperation of the obstetrician.

Our attack on this problem, then, must be directed so far as is possible from a sensible angle, and must apparently be in the main a dietary one. We must remember also, and this is not merely in passing, that man is not a standardized animal. Try as we may to standardize his diet, our success will be largely based on his individual idiosyncrasies, his personal and racial prejudices, his age and his digestion, his health or his lack of it.

Let us analyse now the various food groups and see how they fit into a rational dietary scheme.

The necessary minerals may be divided into four groups, the first, containing sulphur, phosphorus and chlorine forming the acids, the second, containing sodium, potassium, calcium and magnesium forming the bases, the third, containing iron and iodine occurring in essential organic complexes, and the fourth containing those which are found only in traces.

Milk remains one of the necessary articles of food in childhood, furnishing, in addition to protein in its most available form, a digestible fat and vitamins A and B, and to some extent D. Its ash is alkaline.

The cereal grains, with an acid ash, furnish many of the minerals, especially iron, and add to the supply of antineuritic vitamin B if the germ is retained. Their protein is not of a reliable quantity or quality; consequently their chief value is as a source of energy. The sugars contribute only energy except for molasses which, being a concentrated vegetable juice, adds also calcium and iron.

The vegetables and fruits contain iron, other minerals and certain vitamins, the green leaves A and B, the raw fruits, especially the citrus fruits, vitamin C. The ash is usually alkaline. They vary greatly in energy production.

Eggs contribute iron and phosphorus and vitamins A and B and are growth-promoting. Nuts are valuable as sources of proteins of good quality; cheese furnishes concentrated proteins, the fat, calcium, phosphorus and iron of milk, and is a source of vitamin A. The meats, with an acid ash, are sources of protein, phosphorus and iron and vitamin B, but are deficient in calcium and vitamins A and C, except for liver and kidney which supply vitamin A as well as being rich in vitamin B, iron and copper.

The fats are primarily sources of energy and add to the palatability of the diet while tending to retard digestion. Milk fat is rich in vitamin A[21].

In a truly balanced, even if not an orthodox diet, all of the elements necessary for building tissue, furnishing energy and preserving health, including dental health, are present, with the possible exception of vitamin D. This must be added in the form of cod liver oil or one of its substitutes, vitamin D milk or direct irradiation. Vitamin C should be included in much greater quantities than has been our usual custom. In the main we may say that the daily diet of a growing child should consist primarily

of a quart of milk, an adequate source of vitamin D, eight ounces of orange juice or their equivalent, a pound or more of vegetable with one raw vegetable or fruit in addition to the orange juice, one or more eggs, and meat, if possible, once a day. The basic diet having been supplied, the additional calories may be made up with starches or other foods. It is easier to change the monetary system than it is the dietary habits of a nation, but so far as our present problem is concerned the latter is the more important.

Finally, we should avoid faddism and easy ways to attain an hypothetical goal, scrutinizing with care the elaborate claims of manufacturers of this, that or the other concentrated, desiccated and biologically assayed preparation. Man cannot live by bread alone, but neither can he substitute for the natural fruits of the earth the dynamic contents of a pill of any potency.

Of all the midnight marsh glows that civilized or semicivilized man has followed in his pursuit of the true light that would lead to complete and permanent health, the most have been built about his diet. True, his diet has changed as he and his environment have changed, and certainly not always for the better. The focus has shifted from calories to ash and from ash to vitamins, and has rested on those mysterious substances to be found in liver and the gastric glands, until it has seemed almost as if the lowly tripe were at last to come into its own.

From the wheat lands has come a paean of glory in favor of crumbled toasties, and from the plantations of the citrus growers a trumpet note has sounded the knell of acidosis. Still, it must be believed, we are coming nearer to a true understanding of the metabolism of digestion; of man's wants and of the deficiencies which he has imposed upon himself. We are realizing at last that those foods which are nearest at hand, which are most edible in their natural state and which require the least preparation and processing are the best suited to our needs.

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A CONSIDERATION OF THE OBSTETRICAL MANAGEMENT OF PREMATURE LABOR*

BY STEWART H. CLIFFORD, M.D.†

AT the Boston Lying-In Hospital about three per cent of the 3000 deliveries per year result in the birth of premature infants—*yet this three per cent accounts for fifty per cent of the total neonatal deaths.* This latter figure would be much higher were it not for the fact that in the last seven years the gross premature infant mortality has been reduced from fifty-five per cent to between thirty-three per cent and thirty-eight per cent for the past three years. The inability of our present methods to lower further the number of premature infant deaths suggests that new means of attacking the problem must be found.

During the past seven years 243 premature infants have died in the hospital and of these 205, or eighty-five per cent, have died within the first forty-eight hours following birth. This latter fact suggests that the effective approach to the problem will probably be along obstetric rather than pediatric lines. To this end the records of 304 premature infants have been studied as to the influence of the various obstetrical procedures and of the maternal medical complications of pregnancy upon the fate of the infant.

*This is the third in a series of *Studies on the Reduction of the New-Born Infant Death Rate* from the Boston Lying-In Hospital, the Departments of Obstetrics and Pediatrics of the Harvard Medical School and the Department of Child Hygiene of the Harvard School of Public Health.

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THE INFLUENCE OF THE METHOD OF DELIVERY UPON THE PREMATURE INFANT MORTALITY

The records of 291 premature infants delivered in the Boston Lying-In Hospital in 1929 and 1930 have been analyzed to discover the mortality associated with the various types of obstetrical delivery. (Table 1.)

TABLE 1

A Table Compiled from the Records of 291 Premature Infants Delivered in the Boston Lying-In Hospital in 1929 and 1930, Showing the Mortality Associated with the Different Methods of Delivery

Method of Delivery	Total Number of Cases in Group	Number of Living Infants	Number of Dead	Mortality in Per Cent
Low Forceps	27	22	5	18.0
Normal Delivery	163	121	42	25.7
Breech Extraction	31	18	13	42.0
Cesarean Section	63	35	28	44.4
Version and Extraction	7	3	4	57.0

Contrary to existing opinion, the *present technique* of cesarean section appears, according to these statistics, to be one of the most hazardous methods that could be elected for the delivery of a premature infant. The mortality for infants delivered by cesarean section was 44.4 per cent while that for normal and low forceps deliveries was 25.7 per cent and eighteen per cent respectively.

In order to contrast the mortality for full-term infants and premature infants when delivered by cesarean section the records of the sixty-nine abdominal deliveries performed in this hospital in 1931 were examined. Fifty-six of the cesarean sections resulted in the delivery of full-term babies with no deaths. Thirteen resulted in the birth of premature infants weighing five pounds (2270 grams) or less, of whom six died (46 per cent). The birth weights of those dying were, respectively, two pounds two ounces (968 grams); three pounds eight ounces (1589 grams); four pounds eight ounces (2043 grams); four pounds eight ounces (2043 grams); four pounds eleven ounces (2128 grams) and four pounds fifteen ounces (2241 grams).

This serious indictment of cesarean section as a method for the delivery of premature infants stimulated a further investigation seeking to discover an explanation for the high mortality found associated with the procedure. Answers were sought to certain questions. Did the babies delivered by hysterotomy represent infants of smaller birth weight and thus explain the mortality? Did the serious medical complication of pregnancy present in the mother, which necessitated the cesarean section delivery, so lower the viability of the fetus as to help explain this high death-rate? Were there any other factors, besides the actual cesarean section, that could be discovered to explain the high premature infant mortality following abdominal delivery?

THE INFLUENCE OF THE SIZE OF THE INFANT AT BIRTH AND THE COMPLICATIONS OF PREGNANCY PRESENT UPON THE MORTALITY ENCOUNTERED IN THE VARIOUS TYPES OF DELIVERY

In an attempt to discover the influence of the size of the infant at birth and the medical complication of pregnancy present in the mother upon the mortality associated with the various types of delivery, the records of 162 premature and immature infants were analyzed. The results of this investigation are submitted in table 2.

Eighty infants were found whose mothers gave no history of any medical complication of pregnancy. In every instance the mother had gone into labor spontaneously. Sixty-two had been delivered normally or by low forceps with a mortality of 11.3 per cent, while eighteen had been delivered by breech extraction with a mortality of thirty-three per cent. There were no cesarean section deliveries in this group. Inspection of the birth weights of the living and the dead fails to provide an adequate explanation for the mortality encountered. The probable explanation for the breech mortality was the unavoidable trauma incident to the rapid delivery of the unmoulded head, resulting in intracranial hemorrhage.

There were forty-three infants delivered from mothers suffering from pre-eclamptic toxemia. Twenty-eight of these were delivered normally or by low forceps with a mortality of seven per cent. Fourteen of this latter group went into labor spontaneously and were delivered with a mortality of 14.3 per cent while the remaining fourteen were induced with no deaths. Twelve infants were delivered by cesarean section with a thirty-three per cent death-rate. Inspection of the birth weights of the infants of toxemic mothers eliminates size at birth as an explanation for the mortality encountered.

The infants delivered of mothers who had bled prior to delivery comprised a group of twenty-four babies of whom seven were delivered normally or by low forceps with a mortality of 28.6 per cent, while fifteen were delivered by cesarean section with a forty per cent death-rate. Again inspection of the birth weights failed to offer an adequate explanation for the difference in mortality. The occurrence of bleeding was attended by a high infant mortality irrespective of the type of delivery. The probable explanation is that placental hemorrhage deprives the fetus of

TABLE 2

A Statistical Study of 162 Premature and Immature Infants Delivered in the Boston Lying-In Hospital in 1930 and Part of 1931 Tabulated According to:

1. The mortality rates associated with the various methods of delivery subdivided according to the medical complication of pregnancy present.
2. The actual birth weights of the infants making up the different groups.

Method of Delivery	Birth Weight and Fate of Infant in Uncomplicated Pregnancies						Birth Weight and Fate of Infant in Preëclamptic Toxemia				Birth Weight and Fate of Infant of Bleeding Mothers				Birth Weight and Fate of Infant in Heart Disease				Combined Totals	
	Spontaneous Labor						Spontaneous		Induced		Spontaneous		Induced		Spontaneous		Induced			
	Living				Dead		Living	Dead	Living	Dead	Living	Dead	Living	Dead	Living	Dead	Living	Dead	Living	Dead
Normal and Low Forceps	2-10	4-1	4-12	5-3	2-0		2-15	3-4	1-15		2-10	3-5*			4-5		5-2			
	2-10	4-3	4-12	5-3	2-15		3-0	3-10	3-10		3-1	5-14			4-10	None	5-5	None		
	2-14	4-4	4-14	5-3	3-0		3-1		3-13		3-1				5-2					
	3-1	4-5	4-14	5-4	3-2		4-8		4-0		4-4				5-12					
	3-1	4-5	4-14	5-4	3-7		4-9		4-2		4-5									
	3-7	4-6	4-15	5-4	3-10*		4-11		4-10											
	3-10	4-6	4-15	5-7	3-13		4-14		4-11	None										
	3-12	4-7	5-0	5-8			5-0		5-0											
	3-13	4-8	5-0	5-9			5-2		5-0											
	3-14	4-8	5-2	5-10			5-4		5-0											
	3-14	4-8	5-2	5-11			5-4		5-3											
	3-15	4-8	5-3	5-12			5-10		5-4											
	4-0	4-9	5-3	5-12					5-4											
	4-1	4-10	5-3						5-4											
Total No. of Cases	55				7		12	2	14	0	5	2			4	0	2	0	92	11
Mortality	11.3%						14.3%		0%		28.6%				0%		0%		10.7%	
Cesarean Section									2-2	3-0			4-6	2-11*			3-0	2-2		
									2-12	4-1			4-10	3-10			5-0	2-14		
									4-2	4-5			4-14	4-0			5-1	3-8		
									4-4	4-15			5-4	4-0				4-11*		
									4-9				5-4	4-8				4-14*		
									5-3				5-5	5-15*				5-12*		
									5-12				5-10							
									5-12				5-11							
													5-12							
Total No. of Cases							8	4			9	6			3	6			20	16
Mortality							33%				40%				67%				44.4%	
Breech	2-14	4-0	4-7	5-7	1-11	3-4	3-4					3-0*							15	8
	3-11	4-2	5-6	5-8	2-14	3-12	4-0	None			None	3-5							35%	
	3-11	4-5	5-6	5-11	2-14	4-2	5-4													
Total No. of Cases	12				6		3	0			0	2								
Mortality	33%						0%				100%									

GRAND TOTAL NO. CASES	127 35
MORTALITY	27.6%

*Indicates cases receiving antepartum morphine.

oxygen and produces grave intra-uterine asphyxia. The present investigation did not include the infants dying in utero so that the mortality figures refer to infants who had suffered a milder but nevertheless eventually fatal degree of asphyxia. The influence of drugs administered to the mother during labor may have played an important part in the production of extra-uterine asphyxia and may help to explain the mortality encountered. This factor will be discussed in more detail in another section.

There were fifteen infants born of mothers with heart disease, and of these, six were delivered normally or by low forceps without a death. Nine were delivered by cesarean section with a mortality of sixty-seven per cent. Three of the six deaths after hysterotomy were in infants weighing more than four and one-half pounds whose mothers had received an injection of morphine within an hour of their delivery.

THE INFLUENCE OF ANTEPARTUM ADMINISTRATION OF MORPHINE UPON THE PREMATURE INFANT MORTALITY

The antepartum use of morphine is discouraged in this hospital except under special circumstances. The records show that it is sometimes administered in the presence of vigorous bleeding, in heart disease and in an effort to arrest premature labor. It is important to note that the indications for the use of morphine or its derivatives frequently result in its having been administered prior to the delivery of a premature infant.

In every instance, in this short series, where the mother had received an injection of morphine within one and one-half hours of the birth of a *premature* infant, that infant has been dead within forty-eight hours. At birth these infants have been cyanotic, limp and very difficult to resuscitate. In other words their respiration has been embarrassed and they have presented the clinical picture of asphyxia or respiratory center failure. In table 2 an asterisk identifies the seven morphinized infants in whom this condition was present. The antepartum use of morphine is held to be responsible for three of the six deaths following cesarean section delivery of mothers with heart disease, and for two of the six deaths following the same method of delivering the mothers with vaginal bleeding. Four of the infants dying with a history of morphine antenatally weighed over four pounds eleven ounces (2128 grams). One of these infants, weighing five pounds twelve ounces (2605 grams), lived sixteen hours with continuous cyanosis and profound respiratory distress, and at autopsy showed microscopically actual degenerative changes in the medulla as the sole explanation for the extra-uterine asphyxia.

DISCUSSION

Any successful method of handling the premature infant, whether it be by the obstetrician at delivery or by the pediatrician after birth, must be founded upon an appreciation of the peculiar physiological characteristics of the premature child. The two most striking physiological characteristics of obstetrical importance are the following: the ease with which serious bleeding may take place, and the marked inefficiency of the immature respiratory center. Hemorrhage is the chief cause of premature infant death in the early days of life, and evidence of some degree of bleeding will be found in the majority of autopsies performed on these infants. This bleeding may consist of petechial hemorrhages scattered throughout the organs or of gross hemorrhage, chiefly in the intracranial region. It is generally appreciated that this bleeding may occur with the slightest trauma, but of equal importance is the hemorrhage that may occur secondary to intra- or extra-uterine asphyxia. The mechanics by which this latter type of hemorrhage occurs is not clear; it may be due to an increase in blood pressure coupled with actual weakening of the blood vessel walls secondary to the anoxemia. Whatever the true explanation may prove to be, the successful delivery of a premature infant must protect him not only from every possible trauma, but also from asphyxia.

The inefficiency of the respiratory center in the premature infant is well known. Cheyne-Stokes type of respiration is so commonly seen in these babies as to be considered almost a normal finding. The ease with which cyanotic attacks occur in premature infants is still further evidence of the depressed condition of the respiratory center. With the vital centers of the medulla in this extremely susceptible state, any superimposed depressant factor is likely to be incompatible with life. Edema or hemorrhage in the medulla resulting from trauma or asphyxia are the most commonly considered factors causing a fatal depression of the respiratory center, but the present investigation suggests that certain drugs administered to the mother during labor may exert an equally dangerous depressant action upon this vital area.

Delivery of a Premature Infant by Cesarean Section

One must face the fact, whatever the explanation will prove to be, that the premature infants in this series, when delivered by the present technique of cesarean section, actually encountered a much higher mortality rate than those delivered normally or by low forceps. This higher mortality does not find a satisfactory explanation in the lower weights of those delivered by hysterotomy. It does not seem to

find an explanation in the assumption that the serious toxemia present in some of the women resulted in babies with less chance of living, for the figures show that these babies actually have a lower mortality rate than those from mothers with bleeding or heart disease also delivered by cesarean section. Furthermore, these patients with severe toxemia, exhibit a low mortality rate when delivered from below.

Rationally, cesarean section should be the ideal method for the safe delivery of a premature infant, and that it is made to appear in such an unfavorable light demands an explanation. The clue to the problem would seem to lie in the peculiar physiological characteristics of the premature infant himself. The premature infant cannot be treated as just a small edition of a full-term baby, and methods that may be successful with the latter are not necessarily the most advisable when dealing with the immature organism. The full-term infant may be none the worse through absorption of antepartum morphine administered to the mother—beyond requiring resuscitation at birth. Morphine prior to the birth of a premature infant, on the other hand, either lowers the threshold of an already depressed respiratory center to a point where there is no attempt at respiration, although the heart is acting normally, or respiration may be instituted but at such an inefficient level that anoxemia is constantly present. In the latter situation death soon takes place, usually as a result of hemorrhage or pneumonia that would appear in this case to be secondary to the asphyxia.

We are at present pursuing this line of investigation further with the suspicion that ether may exert a similar, but less fatal, depressant action upon the immature respiratory center and thus be partly responsible for the high mortality associated with delivery by cesarean section. Abdominal delivery under ether anesthesia may be the safest possible method for the delivery of a full-term infant, but it remains for future investigations so to modify the technique that it may be made safe for the premature child.

The Management of Premature Labor in Normal Pregnancies

In the presence of a threatened premature labor, with the infant presenting by the vertex, the safest procedure appears to be to allow normal delivery from below assisted by an episiotomy and possibly application of low forceps. It would be extremely dangerous to attempt to arrest labor through the administration of morphine.

The delivery of a premature infant by breech extraction is attended with a high mortality due to intracranial hemorrhage. At the present time this mortality is no higher than that associated with cesarean section, but if the cesarean section hazard can be lowered, as we believe it can be, it may eventually be safer, from the point of view of the infant, to deliver these babies by the abdominal route.

The Management of Premature Labor in Toxemia

The lowest premature infant mortality rate, in pregnancies complicated by pre-eclamptic toxemia, appears to be in the group in which labor is artificially induced and the baby delivered from below. The patients going into labor spontaneously and delivering from below have the next lowest mortality. A possible explanation for the lower death rate in the former group is discussed at the end of this section.

In the toxemia cases, delivery by cesarean section is responsible for the greatest percentage of fatal cases. Future studies may produce a safer method of hysterotomy, but as it now stands cesarean section is a hazardous operation from the point of view of the baby.

The fetus *in utero* of a patient suffering from toxemia is exposed to an additional hazard of intra-uterine extinction that exerts a strong influence upon the obstetrical management. The placenta in toxemia may become diseased to the point where fetal life is impossible, or as a result of this disease it may separate prematurely and cause fetal death by intra-uterine asphyxia before delivery can be accomplished. Since it is now possible to determine the minimum weight of the fetus by stereoroentgenometry[1], it may prove safer to terminate pregnancy in toxemia at a point where a living viable fetus can be demonstrated rather than allow pregnancy to continue to its natural termination with its risk of intra-uterine death.

The Management of Premature Labor in Bleeding

Irrespective of the method of delivery, the premature infant faces his greatest risk in the presence of vaginal bleeding. The reason for this would seem to be that bleeding indicates a separated placenta or a placenta previa, and in either case indicates a serious interference with the normal placental exchange. A second reason for the high mortality associated with bleeding is the fact that the treatment of the hemorrhage may include the maternal administration of some form of morphine.

According to the available statistics, delivery from below in the presence of bleeding is attended with a slightly lower infant mortality than delivery by cesarean section. The figures are open to the criticism that the normal delivery takes place in patients with minor or arrested hemorrhage, while cesarean section is frequently an emergency measure to cope with a massive hemorrhage.

In the presence of bleeding or threatened

hemorrhage the fetus is exposed to an even greater danger of intra-uterine death than is the case in toxemia. Since it is now possible to know the size of the fetus *in utero*[1], the question arises as to whether it would be safer to terminate pregnancy in these cases when a viable infant can be demonstrated, or to allow pregnancy to continue and expose both the fetus and the mother to the possible danger of a massive hemorrhage.

The Management of Premature Labor in Heart Disease

When pregnancy is complicated by heart disease, normal or low forceps delivery is attended by a very low mortality rate while delivery by cesarean section encounters a sixty-seven per cent rate. Here again the antepartum use of morphine is the probable cause of the high mortality in the hysterotomy cases.

Apparently when heart disease is the only complication of pregnancy the fetus is not exposed to the danger of intra-uterine death, and pregnancy may be allowed to continue to as near full term as the condition of the mother will permit. Increased experience may demonstrate the advisability of inducing labor in patients with heart disease when a viable baby can be assured[1], thus sparing the mother the strain of an unnecessary prolongation of pregnancy.

CONCLUSIONS

1. A statistical study of the records of 304 premature infants has revealed that the safest method of delivery is either normally or by low forceps, while the most dangerous is by the *present technique* of cesarean section which carries a mortality of 44.4 per cent.

2. The antepartum administration of morphine within one and one-half hours of the delivery of a premature infant was found to be associated in every instance with the death of that infant.*

3. The peculiar physiological characteristics of the premature infant have been discussed as to their bearing upon the successful obstetrical management of premature deliveries.

4. This high mortality was not felt to be due to a smaller size of baby delivered by hysterotomy or to the presence of toxemia in the mother. The high mortality associated with delivery by cesarean section is not felt to be due to the actual operative delivery itself, but rather to the depressant effect of morphine and possibly ether upon the physiologically immature respiratory center of the premature infant.

5. Cesarean section is the logical method for the safe delivery of a premature infant. It undoubtedly eliminates the factor of trauma during delivery, but the present technique substitutes an even more dangerous one, asphyxia, in its place. Improvements in the method of cesarean section that will protect the premature fetus from intra- and extra-uterine asphyxia as well as trauma should establish abdominal delivery as the safest possible method for the delivery of a premature infant.

6. In pregnancies complicated by toxemia and placenta previa there is a risk of fetal death and possible danger to the mother in allowing pregnancy to continue to its natural termination. The question is raised as to the wisdom of artificially terminating these pregnancies at the point when a viable fetus can be demonstrated by stereoroentgenometric examination.

7. In pregnancies complicated by heart disease there is apparently no danger of intra-uterine fetal death should pregnancy be prolonged to full term. There is a risk to the cardiac mother in an unnecessary prolongation of pregnancy. The question is raised in this connection as to the wisdom of artificially terminating pregnancy in these cases when viability of the fetus can be demonstrated.

8. The present conclusions in regard to the obstetrical management of premature labors are presented at this time in the hope that they may stimulate discussion and further investigation. They are purely tentative and will undoubtedly be considerably revised as our experience grows. Obstetrical attention can be profitably concentrated on bettering the conditions in a group of infants that, while representing but three per cent of the total number of deliveries, accounts for fifty per cent of the neonatal deaths.

*To date the possible influence of morphine has been investigated further in 850 consecutive premature infant deliveries: seven hundred and fifty-two mothers received no morphine within 4 hours of delivery—Infant Mortality 36%. Ninety-eight mothers received morphine within 4 hours of delivery—Infant Mortality 60%.

S. H. C. March 9, 1934.

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MEDICAL HISTORY OF CONTRACEPTION*

BY NORMAN E. HIMES, PH.D.†

Members of the Boston Medical History Club:

I COME before you with some timidity as a layman. Let me assure you at once that my investigation of the history of contraception has proceeded from no desire to usurp a medical function. A prominent medical body, the National Committee on Maternal Health of New York, requested me in 1930 to undertake it probably because its officers realized that a few years previously I had, as a fellow of the Social Science Research Council, made a special study of the social and economic aspects of the birth-control movement especially in England, together with the first independent quantitative study of the clinical records of English contraceptive clinics. A cursory survey soon showed that medical historians had paid virtually no attention to the subject. I had not investigated the history prior to 1800, and was anxious to find out something about it. Accordingly, letters were sent to some thirty prominent medical historians requesting references to the medical literature produced before 1800. Only two or three helpful replies were received. The lack of interest, therefore, on the part of medical historians was the first inducement. The second was the realization that such an historical account might interest not only the physician but the historian, sociologist, economist and anthropologist. If the subject went beyond my depth medically, there was always the medical board of the Committee to assist. Moreover, had not Hippocrates himself said that the good physician will not hesitate to learn from the special investigations of laymen?

What was originally intended to be two chapters for a medical source book, soon developed, as I delved into the original sources, into a monograph of 900 pages with a bibliography of approximately 2000 titles. This is about to go to press as *The Development of Birth Control: A Chapter in Medical History*. What follows are leading facts or generalizations excerpted from that volume; and, if at times my statements seem dogmatic, I can only plead lack of time to support them, and make the urgent request that you cross-examine me in the discussion to follow.

The first important fact to get straight is that birth control as a social practice did not begin in response to the teachings of Margaret Sanger or Marie Stopes; not even with the prosecution in London in 1877-1879 of Bradlaugh and Besant for re-issuing the Knowlton pamphlet; nor even with Francis Place's propaganda in the 1820's. As a social practice contraception goes back to the period of prehistory, to the primordial tribes of which contemporary primitive races may be said to be the social fossils. As a social movement, as I shall show later, birth control dates from the agitation led by Place in 1823.

Another important conclusion is this: My study shows, I think conclusively, that the *desire* to control conception, as distinct from its scientific achievement, not only antedates its written history, but is a cultural factor, a personal behavior pattern found in nearly all prominent civilizations in some degree at all times.

A survey of primitive societies by tribes and continents shows that several had crude contraceptive knowledge, but that more commonly the volitional checks were abortion and infanticide. Most primitive societies had a controlled population. As to rational preventive methods, *coitus interruptus* was perhaps most common. The most unique, perhaps, is a sort of female condom used by the Djukas of Dutch Guiana. It is made of a native seed pod resembling our milkweed pod. One end is snipped off, the other inserted in the posterior fornix of the vagina, and the open end receives the penis and semen. The highly-spermicidal lemon juice is reported in use by one tribe, but there is some doubt about the credibility of the report.

There is much difference of opinion among anthropologists regarding the purpose and sterilizing effectiveness of an Australian operation on primitive males known as subincision (mica, koolpi). This consists in dissecting out portions of the urethra or even all the conduit. The controversial literature cannot be reviewed here. German writers have, generally speaking, considered it effective. American and English anthropologists consider it a status-giving rite; the boy is not a member of the tribe until the mutilating ceremony is performed. Some anthropologists have even gone so far as to say that it does not affect fertility. This position seems to me extreme. Clearly such an operation would reduce the optimum conditions for impregnation.

In the Malay Archipelago ovariotomy and artificial retroflexion of the uterus by massage is reported; but, since the organ tends to assume its former position, such manipulations by midwives must be useless.

Taboos on sex intercourse are frequent in primitive societies, and many are the groups the medicine men of which have devised concoctions to be taken by the mouth. But no potion so taken is known to be effectively contraceptive. Weird magical procedures are so numerous among preliterate peoples as to baffle an attempt to detail them in a short account. The knot-tying variety have persisted through folk medicine into late modern times.

Turning now to the civilizations of antiquity,

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the Greeks made notable advances in contraceptive medicine. To be sure, two Egyptian papyri, the Petri or Kahun papyrus and the Ebers papyrus, dating respectively from 1850 B.C. and 1550 B.C., show conclusively that many centuries before the Christian Era the Egyptians recommended vaginal suppositories of gummy and sticky substances (gum arabic, honey, crocodile dung, natron [native sodium carbonate] etc.). The dung pessary has been traced through the literature for approximately three thousand years. The tips of acacia, mentioned in the Ebers papyrus, break down under fermentation into lactic acid, a substance widely used in recent years in jelly form as an ointment for rubber vaginal diaphragms and caps.

Among the Greek and Roman writers who discussed contraception are Aristotle (IV-2 B.C.)*, the pseudo-Hippocratic writers (IV & V B.C.), Lucretius (I-1 B.C.), Pliny (I-2), Dioscorides (I-2), Soranos of Ephesus (II-1), Oribasios (IV-2) and St. Jerome (IV-2) and Aëtios of Amida (VI-1). Of these, the most important authors are Soranos, the greatest gynecologist of antiquity, who produced, incidentally, in his *Gynecology*, the most brilliant account on contraception until Knowlton (1832)[1]. The next most important figure, Aëtios of Amida (VI-1), was less original and brilliant. He did well by knowing whom to select as his master, Soranos. Pliny is full of superstition on this as on other subjects, while Oribasios mentions the subject only briefly. Aristotle's mention in the *Historia Animalium* in the fourth century B.C. (the first mention among the Greeks) of anointing the os "with ointment of lead or with frankincense, commingled with olive oil," is historically important.

To return to Soranos: I have recently published in the *New England Journal of Medicine* the first English text of Soranos's discussion of contraception[2]. He details for us an elaborate array of occlusive pessaries (more exactly, suppositories) of various types, vaginal plugs using wool as a base, and impregnated with gummy substances such as sour oil, honey, cedar-gum, opobalsam and galbanum. The astringent solutions mentioned, alum and natron, contract the os and make impregnation less likely. Gummy and oily substances, of course, reduce the motility of spermatozoa. The use of native fruit acids is not without interest in view of recent researches by Voge and Baker[14, 15]. Pomegranate pulp or rind is acid; gall-nut contains gallotanic acid. Fig pulp is also mentioned. Acids and alkalines, if not neutralized by buffers, and if strong enough to upset the normal vaginal condition, provide a hostile environment for sperms.

Soranos thought the "damage" done by potion-drinking "very considerable"—a modern view; and he scoffed at the use of amulets, even more commonly used in the Middle Ages than in antiquity, to prevent conception.

Turning to the early Christians and Hebrews everyone is familiar with the reference to Onan, who, by the way, was, on a proper interpretation of the text, slain not for practising *coitus interruptus*, but because he failed to fulfill the law of the levirate and raise progeny by the wife of his deceased brother.

The Talmud mentions embryotomy, *coitus interruptus*, spongy substances (mokh) placed before the os, violent bodily movements designed to expel the semen—this dates from preliterate society as does *coitus interruptus*—and potions. There is also some discussion of indications, rare in the early period, though Soranos had by no means neglected them. Though the early Hebrews disdained sterility, as every primitive group did, the obligation to be fruitful and multiply was, curiously enough, not encumbent on the woman but only on the man. Dr. Solomon Gandz, perhaps America's greatest Talmudic scholar, who prepared the chapter on the Talmud for my treatise, so informs me. He says that since the woman, who was free from the duty of propagation, employed the contraceptives, there was no reason in Hebrew law and morals to forbid their use, especially when medically indicated. All this may seem curious to us, but such is the verdict of an expert. Moreover, granting the assumptions, the conclusion is logical enough.

Compared with what is to be found in Greek, Roman and Islamic sources, we find little mention of contraception in ancient Sanskrit and Chinese sources. This should not, however, convey the impression that the record is blank. The early East Indian writers mentioned chiefly an elaborate array of potions; the ancient Chinese had potions also, though fewer in number, despite the prevalence of ancestor worship and the dominance of the doctrine of filial piety. *Coitus obstructus*, which is more or less widespread, also appears in Sanskrit sources antedating the fourteenth century (The Ratirahasya by Kokkoka). Pressure of the finger at the base of the phallus just before ejaculation causes the semen to regurgitate into the bladder. The magical Sanskrit prescriptions ranged from rubbing the navel or the soles of the foot with salves made of native flora to drinking potions. Of rational remedies there are few indeed. Of 27 Sanskrit recipes that I have collected, 23 are magical (19 are potions) and only four rational or quasi-rational. Among the latter are *coitus obstructus*, smearing the vagina with honey and ghee (an oily residue made by boiling down butter), vaginal medication with rock salt dipped in oil, tampons of ground *ajowan* seed and rock salt with oil. It may be remarked that ordinary table salt is an excellent spermicide. An eight per cent solution kills sperms rapidly. As used in

*IV-2 means second half of the fourth century. The same system is employed throughout for brevity.

our time five tablespoonfuls are dissolved in a quart of water.

The chief difficulty with the ancient contraceptive prescriptions is not that some of them are not effective, but that little distinction was made between the effective and ineffective; between the genuine spermicides and the motility-impeding and movement-obstructing remedies on the one hand, and the magical, ritualistic prescriptions on the other. Most physicians were, therefore, unable to make some very necessary distinctions. Besides, such instruction was, in some countries and periods, chiefly in the hands of midwives.

The Japanese contraceptives are of unknown age. There are the *kabutogata* or hard condom made of tortoise shell, horn, or leather, the use by prostitutes of *misugami* (a ball of bamboo tissue-paper before the os), potions and some magical procedures. In the seventeenth century Yokiken Kaibara anticipated two Americans, J. H. Noyes and A. B. Stockham, in advocating suppression of ejaculation. The motive was, however, to prolong life, not contraception. The rubber condom was not introduced into Japan until about 1880.

It was the great Islamic physicians, the Arabians and Persians, who, during the Middle Ages, inherited the medical knowledge of the Greeks and preserved and amplified it for us. The chief contributors to contraceptive medicine in this group were the Persian Ali ibn Abbas (X) in his *Royal Book*, the Arabian Ibn Sina in the great *Canon* (XI-2), the Persian Isma il al-Jurjani (XII-1) in the *Treasure of the King of Kwarizm* and Ibn al-Jami, *The Book of Right Conduct*. Ibn al-Baitar's *Treatise on Simples* (XIII-2) and Dawud al-Antaki's *Memorial* represent a definite decline in Islamic contraceptive medicine.

There are 31 different recipes mentioned by the first four writers, who represent Islamic contraceptive medicine at its best. The rational element bulks large. There are two potions and one magical method (rennet of rabbit or weeping willow leaves worn as an amulet) and 13 different suppositories and tampons. Among the latter are (a) pulp of pomegranate with alum, (b) rock salt, (c) cabbage leaves with tar. There are nine techniques to be used by the man: besides withdrawal, anointing the male organ with such substances as rock salt, tar, onion juice, oils of balsam, sesame, etc. Among miscellaneous techniques are the safe period (dates at least from Soranos), avoiding simultaneous orgasms, sneezing, raising the thigh, bodily movements to void the semen.

This collection is remarkable for the period, and shows clearly the influence of the Greeks, notably Soranos and Aëtios. In some instances the mistake was made of recommending the insertion of suppositories after, rather than before coitus.

Islamic physicians, like those of Greece, devoted comparatively little attention to indications for contraception. Ibn al-Jami (XIII) makes no mention of them, but Ali ibn Abbas (X) mentioned "a small uterus" and any "disease which would render gravidity so dangerous that the patient might die during parturition." Ibn Sina (XI) thought contraception indicated for "a small woman to whom childbirth would be dangerous, or . . . [for] women who are suffering from a disease of the uterus or from a weakness of the bladder"; while Isma il al-Jurjani (XII) mentioned a woman of "tender years" and also anyone suffering from "weakness of the bladder"; and any case in which "there is fear that pregnancy will bring on some illness such as incontinence of urine, uterine erosion, etc." Thus we see that the germ of the preventive point of view appears early in this field. This is not to gainsay that only recently has it made substantial progress.

The evidence suggests that some Islamic physicians of the Middle Ages were in advance of some of their modern colleagues in this respect. The attitude of Islamic religion, be it noted, was very different from that of early Christianity. Since the doctrine was current that the fetus was not a human being until it had reached the distinctly human form, Islamic religion did not condemn abortion, much less anti-conceptional measures.

Ibn al-Baitar and Dawud al-Antaki represent the same point of view and the same medical tradition with a much greater admixture of magic. Of the writers who stressed magical procedures Dawud al-Antaki is the worst in medical history.

During the Middle Ages, both inside and outside the Islamic world, but especially outside of Islam, there was considerable confidence in the contraceptive powers of drugs, gems and stones. Islam was the preserver of the great tradition. Elsewhere people tended to hold contraceptive views similar to those of Albert the Great, namely, that if a woman spit thrice in the mouth of a frog she would not become pregnant. The Catholic Church then, as now, condemned contraception.

The major portion of erotic literature, I am assured, is silent on contraception. Exceptions are Nefzaoui's *The Perfumed Garden*, Brantôme's *The Life of Gallant Ladies*, and Casanova's *Mémoires*. The first mentioned alum, while Casanova relies on the sheath and the gold ball, used intravaginally.

So far as folk beliefs are concerned it is sufficient to say that many of the superstitions still current, especially among European peasants, are, in some instances, several thousand years old. Such are amulets, knot-tying, coughing, sneezing, the safe-period and countless others. Potions and symbolic magic bulk large, but there are a few remarkable recipes on record.

Examples are the use of a sponge by the rural women of Southeast Poland and in the Ukraine, and the use of beeswax intravaginally by German-Hungarian women in Banate. Slovak women and women of the Styrian Oberland, who stuff the vagina with cloth or with linen rags, are reminiscent of the African natives reported by W. E. Masters[3]. These African women did likewise. Constantinople women are reported to have soaked a sponge in diluted lemon juice, and to have used it as a vaginal tampon.

The persistence of such folk practices for thousands of years is convincing proof of the thesis that women have in all cultures and in all ages desired to control fertility. To be sure, they have disdained sterility; but they have also wanted controlled fertility, that is, a reasonable number of children at convenient times and under the conditions desired. What is new is not the desire for prevention, but effective, harmless means of achieving it on a grand scale.

The history of the condom or sheath is intimately bound up with the history, since the fifteenth century, of man's attempt to protect himself from the scourge of syphilis. It seems reasonable to conclude that this was its first use medically*, certainly its first use on a large scale. One may doubt the legend of Minos and Pasiphae that the sheath was used in Imperial Rome. The first written mention that has come to my attention is that in Fallopius's *De morbo gallico* (1564). This was a linen glans condom. Only later were the caeces of various animals used. Gradually what was used for protection against syphilis came to be used to prevent conception and by the late eighteenth century they were publicly advertised in England. The real revolution was a result of the vulcanization of rubber by Goodyear about 1840. The much cheaper rubber condom then found a wide market. One associates the vulcanization of rubber with a revolution in transport; less frequently with a revolution in morals and in the birth rate. The extreme popularity of the instrument is not sufficiently realized. The fifteen chief manufacturers in the United States produce a million and a half a day[4]; and it has come to light in a recent court case that one American manufacturer sold 20,000,000 during one recent year[5]. Harmsen reports that one German firm puts 24,000,000 rubber condoms on the market every year[6].

After 1800, developments in the medical history of contraception are so numerous as to render succinct, balanced summary difficult. There is time to dwell only on a few points briefly.

After the publication of Malthus's *Essay on Population* (1798) the medical history of contraception became intertwined with the social and economic phases of that history. Ever since they have been inseparable, if one takes a broad view of the subject. The social agitation dates from Francis Place's (1771-1854) dissemination of popular medical handbills in 1823, and from the publication of Richard Garlile's *Every Woman's Book* (1826). Place's efforts were the first organized, planned attempt in history to educate the masses in contraceptive technique.

The reasons that the birth-control movement as a social movement began at this time rather than before or later are plain but complicated. In short, the chief factors were these: The Industrial Revolution by increasing production, and the growth of public health medicine by dropping the death rate, caused population to increase rapidly. There were fears of over-population—not altogether ill-founded at the time. A small group of radicals led by Francis Place felt that Malthus's proposal of delayed marriage would encourage prostitution if followed, but more likely it would not be followed and population control would not be achieved. Hence in his important book on population[7], published in 1822, he defended early marriage and artificial checks. He advocated contraception likewise in newspaper and periodical articles, and gave medical information in his handbills. What Place's daring started is a long story and will require a couple of volumes to tell.

Other social circumstances besides rapid population growth, the Industrial Revolution and Malthus's *Essay* were certain tendencies in thought: hedonism, materialism, the gradual breakdown of religious taboos, the growth of the scientific spirit. Recent events have strengthened these tendencies and new ones have appeared: urbanism, the desire to protect a high standard of living, increased social mobility, and improved methods of communicating knowledge.

The demand for birth-control knowledge first became articulate in the United States in 1831 with the publication of Robert Dale Owen's *Moral Physiology*[7a]. There was nothing original in it medically, its significance being in its pioneering nature, in the social reasoning it contained, in the discussion it provoked, and in its influence on Charles Knowlton (1800-1850).

Knowlton, a member of the Massachusetts Medical Society, published in 1832 the *Fruits of Philosophy, or the private companion of young married people.* He is the founder of American contraceptive medicine, the first physician to publish an independent treatise on the subject. His is the fullest account since Soranos's in the second century—a span of sixteen hundred years. Knowlton saw his problem whole, and discussed not only the medical but the economic and social bearings of his subject. He is the first physician in all time (so far as

*Coverings for the penis for non-contraceptive uses have a long history that reaches into prehistory. They were used as badges of rank and status, as amulets to promote fertility, as coverings to protect against insect bites. The earliest known medical use is their employment by certain tropical natives to prevent bilharzia and condirus, tropical diseases caused by minute fish swimming up the urethra. Other primitive groups have used them for decoration or for the sake of modesty.

I can trace) to have done this, and his place in the history of thought has never been properly appreciated. The *Fruits of Philosophy* was a departure in stressing chemical methods and douching. Their popularity is largely due to his initial deviation, for his little book had great influence abroad, especially in England where it was frequently reprinted. A legal battle in 1877-1879 in London over the right to publish it did much to establish freedom of the press in this line in England.

There are probably fifty nineteenth century writers on contraception in the United States and England alone, most but not all of them physicians, who hold a modest place in detailed history of the movement. But they can find no place in an outline of this character. In the last half century probably fifty German pamphlets on technique have been published for general distribution. From the standpoint of scientific advance they are of no importance. Their significance lies in their effect upon sexual relations and on the declining birth rate, phenomena with both medical and social implications.

Probably the most important technical developments of the nineteenth century were the rubber condom and the Mensinga vaginal diaphragm. I have already mentioned the former. The Mensinga pessary was invented by the German anatomist of that name and is now the chief device used in hundreds of clinics here and abroad. The inventor of the rubber cervical cap is unknown. This cap or "check pessary" appeared in English advertisements about 1870 or 1880 and in the U. S. A. at about the same time. It is still rather widely used.

Suppositories, as we know from the Greek and Islamic accounts, are very old so far as the principle of a physical impediment is concerned. Occasionally the ancients, probably by trial and error, that great educator of mankind, hit upon suppositories employing a rational chemical principle. But generally speaking, suppositories that really melt at body temperature are an invention of the last fifty years. Recent investigations show, however, that some of the supposed active agents contained therein have been relatively ineffective as spermicides. Since they often worked on physical rather than spermicidal principles, we have not been so far ahead of the ancients as is commonly supposed.

Little need be said of the intrauterine devices since they were never widely used, being expensive. Better knowledge of the dangers associated with their use has also limited their market.

The chemistry of contraception is a development of the last few decades. What preceded was guesswork, intuition, trial and error. Clinics now use statistical methods in case series to test various combinations.

We now have from 200 to 500 chemical compounds and mechanical devices used for the prevention of conception in addition to so-called natural methods. The more important techniques are treated in several good modern handbooks by Dickinson and Bryant[8], Cooper[9], Matsner[10], Konikow[11], Fraenkel[12], Stopes[13] and others, as well as papers on chemistry by Voge[14] and Baker[15]. In the modern clinics—of which there are now 130 in the United States—the technique preferred is a rubber vaginal diaphragm of Mensinga type smeared with a spermicidal jelly. In a follow-up of several thousand cases for two years or more the method has proved, when properly used, effective in 90-95 per cent of the cases[16]. The method is as harmless and aesthetic as any yet developed.

Commercialization of the sale of contraceptives is undoubtedly new in extent. Probably condoms have been hawked for centuries. It is reported that seventeenth and eighteenth century houses of prostitution were veritable arsenals of them. What we are faced with now, however, is social control over a business that has grown by leaps and bounds. In some European cities sheaths are sold in slot machines and the rubber-shop windows of Charing Cross, London, are notorious for rather objectionable displays and business methods.

The enormous circulation of birth-control literature in the nineteenth century prepared the public mind for clinics for the poor. Dr. Marie Stopes opened one in London in 1921. This was the first in the British Empire though not the first in the world. Dr. Aletta Jacobs had opened one in Holland in 1881 and Margaret Sanger one in Brooklyn in 1916. There are now 130 in the U. S. A. and perhaps 1000 in the world.

One need not labor the point that in western societies in the past few decades there has increasingly been going on a liberalization of medical opinion. Collective votes and summaries of medical symposia have tended more and more to take the view that if the medical profession does not control the movement, quacks and commercializers and ignorant laymen will. Significant is the fact that Dr. Abraham Jacobi in 1912 and Dr. William Allen Pusey in 1924 in their presidential addresses before the American Medical Association supported contraception. Virtually all the clinics in the United States are now guided by competent medical boards responsible to no one but themselves for the medical side of the work. Even a propaganda organization like the American Birth Control League can boast of an unusually competent medical advisory board containing important names.

What are the more direct and immediate implications for medicine that the history of contraception teaches? (1) The desire for prevention is so universal it cannot be uprooted. At best it can be guided. (2) If the medical pro-

fession does not guide the movement some one else will. (3) Birth control has survived nearly two thousand years of religious condemnation (by Christianity at least) and has grown increasingly strong. This might suggest that much of the lingering opposition is futile. (4) The immediate task of medical science is to improve our knowledge by more research. Improving techniques is more important than refining indications. (5) If the medical profession accepts medical indications but rejects the social and economic indications it will fail to see its problems whole. (6) If the knowledge is carried to extremes in some quarters, the medical profession must view it with tolerance and understanding. The desire for control may be carried too far soon after freedom is won because any social force, once it gathers momentum, tends to go beyond the equilibrium point until new forces check it and restore equilibrium. If we listen to the hot-heads, to the panic-stricken, we will most certainly act unwisely. Every new invention is open to abuse. But we do not advocate illiteracy because some people may forge checks.

What will be the long run effects socially of diffused knowledge of contraception? No one knows. But some results are more probable than others. Northern and Western Europe and the United States will have a stationary population in a few decades. That is certain, and there need be no alarm about it. The rate of population increase of the last century was unique in history and abnormal. Diffused contraception should reduce the abortion rate and the death rate from certain diseases. Other factors remaining equal, it should raise the standard of living, soften some of the worst aspects of poverty, reduce the potency of one of the causes of war—population pressure on resources (e.g., Japan and Italy). It should have many other socially desirable effects, but, of course, it is no panacea. There are reasons for believing that in the long run it will be judiciously used rather than abused.

If contraception has, when wisely employed, the medical, social and economic advantages its supporters allege, we ought to put it in its proper place as a phase of preventive medicine and public health. Such a position is not radical. It is the attitude of classical medicine. It is the view of some of the greatest physicians of all time. From the first, contraception has been supported by the important men in medicine.

Once the democratic process, initiated by Francis Place, is complete, it is difficult to conceive of mankind giving up its newly-gained knowledge. Then one more battle along the front of preventive medicine will have been won. When this day arrives, let us not forget to honor the pioneers, many of whom suffered that light might shine in dark corners. If contraception has permanent value in modern medical technique, as I think it has, the least we can do is humbly to lay a wreath of respect at the feet of the great physicians, who, in times past, have preserved and enriched the noble tradition of antiquity.

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INFESTATION WITH DIPHYLLOBOTHRIUM LATUM. FISH TAPEWORM*

BY ENSIO K. F. RONKA, M.D.†

THE present report dealing with a case of fish tapeworm, Diphyllobothrium latum infection, is presented as additional data to the study of this parasitic infestation in Massachusetts.

The fish tapeworm belongs to the Cestode class of the Platyhelminthes or flat worms. The fish tapeworm spends its larval stage in the muscular tissue of fresh water fish, its adult stage in the human intestine. The adult form has lost all trace of a digestive tract and absorbs food from the intestine of the host all over the surface of its body. The adult tapeworm existing in the intestine of its proper host is divided into a "head" or scolex and numerous segments or proglottids. The latter are self-fertilizing and contain enormous numbers of eggs. The proglottids as they "ripen" break off from the tapeworm and are discharged from the intestine. Each egg or embryo is protected by a tough capsular covering. When eaten by another host of the proper species the tough shell is dissolved. In the new host the embryo lodges in the organs and tissues and is conveyed from these locations by the lymph and blood streams to selective tissues. Here development takes place with the formation of the larval or bladder worm stage. At this time the "head" or scolex with its suckers is also formed. The parasite remains in this stage until the tissue is ingested by a new host. The head is the only part to survive the process of digestion. It attaches itself by means of its suckers to the wall of the intestine, where it proceeds to develop new segments. The growth region is the area distal to the neck, the neck being the attenuated portion behind the scolex or head. The head itself is small and spatula-shaped. The freshly expelled proglottids are ivory colored. These are continuously proliferated posteriorly in a tape-like ribbon and thus expelled from the human intestine. Development of the immature segments occurs distally. The process of egg production is initiated in the mature segments. These now become gravid segments, i.e., those in which the uterus has become elongated and twisted back and forth upon itself in the characteristic "rosette" pattern, in order to accommodate the eggs. Mature and gravid segments together occupy about four-fifths of the length of the worm. Each mature proglottid is provided with both primary and secondary male and female reproductive organs.

The eggs of the Diphyllobothrium latum when discharged from the parent ovum are still immature, but are provided with abundant yolk cells to nourish the enclosed embryo until it develops. These eggs are broadly oval in shape. The period of development which occurs in water, i.e., in diluted feces, varies from three to five weeks, depending upon the temperature. The hexacanth form embryo provided with ciliated epithelium makes its escape from the eggs through an operculum and swims about as a so-called plankton organism. This free swimming larva is ultimately ingested by certain minute cercopepod crustaceans. The larva does not remain long in the intestinal canal of this first intermediate host, but migrates into the body cavity where in the course of two or three weeks it is transformed into an elongated oval object, the procercoid larva possessing three pairs of hooklets on its caudal appendage. A single crustacean may have two such larvae developing within it. If a plankton-feeding fresh water fish ingests the infected crustacean, the larva is set free in the stomach of the fish, penetrates its wall in the course of a few days and wanders through the body cavity into the flesh and connective tissue where it becomes transformed into a Sparganum or plerocercoid larva. This larva may multiply itself several fold by asexual methods within the second intermediate host.

Various fresh water fishes, particularly those of lakes and mountain streams, may serve as second intermediate hosts of the infection. Among these the following European species have been incriminated: the pike, the perch, the salmon, the lake trout, and the Japanese rainbow trout; in northern America, the northern pike, the sand pike, and others. Man contracts the infection on consuming insufficiently cooked flesh of the infected fish. The worm proceeds to develop within his intestinal tract and matures in five or six weeks after exposure, at the end of which time eggs first appear in the feces.

CASE HISTORY

Mrs. E. L., aged 28.

Chief complaint: The patient passed "ribbon-like worms." She also had intermittent low abdominal cramps.

Present illness: The patient's attention was called to the existence of the worm by the passing of the ribbon-like object. This happened twice within the past two years. The present illness actually extended back to her childhood when at the age of nine she first remembered of having passed worms. She had had some form of treatment for this condition at that time.

Past history: The patient was born in Finland. She had lived in the United States for the past ten

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years, her first residence in this country being in Medford, Massachusetts. Her first summer was spent at West Barnstable, Cape Cod, at the shore of a fresh water lake. While there an out-of-doors privy was used. Fresh water fish were eaten, but she did not recollect how these fish were prepared. She also lived for some time in Boston and Hamilton, Massachusetts. Several of the following summers were spent in touring the New England states and Pennsylvania in an automobile and camping out-of-doors. She married in Brooklyn, New York, where she lived for a short period. In 1930 she moved to her present residence.

Family history: Her father died from natural causes. Her mother was living, having resided in the United States for the past eleven years. She had passed worms in Finland, but none in this country. The patient had one brother in this country who had a fish tapeworm infection, but became parasite-free under treatment. Her husband and three minor children presented a negative parasitic history.

Physical examination: The patient had moderate tenderness throughout the lower abdomen. No palpable masses were evident. This tenderness disappeared entirely after expulsion of the parasite.

Nervous and mental manifestations: Amongst a large list of disorders that may result from parasitism she presented only some slight pruritus of the nose and anus and numbness and tingling of hands and feet.

Manifestations in the Digestive Tract

Classical Symptoms	The Patient
1. Total or partial lack of appetite.	1. Partial lack of appetite.
2. Salivation increased.	2. Salivation increased.
3. Ructus, pyrosis, nausea, epigastric distress and pain.	3. Nausea and low abdominal pain.
4. Sensation of pressure or of strange movements.	4. Present.
5. Colic and crisis-like attacks.	5. Absent.
6. Vomiting.	6. Vomited twice.
7. Constipation or diarrhea.	7. Constipation.
8. Stomatitis, glossitis.	8. Absent.

No gastric analysis was done on this case. Stools contained ova of Diphyllobothrium latum.

Manifestations in the Blood

Classical Picture	The Patient
1. Number of erythrocytes decreased or normal.	1. 4,200,000.
2. Hemoglobin concentration somewhat diminished.	2. Tallqvist 80%. Haden Hausser 85%.
3. Color index slightly heightened or normal.	3. 1-plus.
4. Appearance of erythrocytes normal or enlarged.	4. Normal in appearance.
5. Leucocytes generally slightly decreased in absolute numbers.	5. 6,300.
6. Differential count may not be altered.	6. Polymorphonuclear neutrophils 64%. Lymphocytes 30%. Endothelials 4%.
7. Inconsistent eosinophilia — generally not associated with Diphyllobothrium infestation.	7. 2%.

Treatment

Filix-mas (male fern) was used. She expelled about three yards of the worm, consisting of proglottids with a centrally located brown uterus. No head was found.

Follow-Up

Several stool specimens examined since the treatment have been ova-negative. The patient had gained weight, her appetite had improved, and she had gone through a normal, uneventful pregnancy.

RÉSUMÉ

1. This patient, though she harbored the fish tapeworm in her intestines, suffered no ill effects from the parasite.

2. She presented a variety of clinical manifestations without anemia.

3. Her functional disorders were referable to the alimentary tract.

4. She exhibited a familial tendency of parasitism.

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VERMONT STATE MEDICAL SOCIETY

THE FUNCTION OF THE GENERAL PRACTITIONER IN PUBLIC HEALTH WORK*

BY HOWARD W. HAGGARD, M.D.†

I DID not construct or even choose the title of this paper "The Function of the General Practitioner in Public Health Work"; it was contributed by the secretary of your society. Now a gift is above criticism in public, but not above critical inspection in private. And so in that moment which comes to all of us when we try to think of something appropriate to the title, I took this one apart word by word in the hope that a hidden inspiration might come tumbling from between the words. But all that I found there was a query. And that query is this: What *is* a general practitioner? And whatever he may be, what is his especial relation to public health work?

If there are such beings as general practitioners, there must be, in distinction, special practitioners. Nor is the specialist a new development in medicine. The Greek, Herodotus, the father of history, nearly a contemporary of Hippocrates, tells us with very doubtful veracity that among the ancient Egyptians there were no general practitioners, but instead only specialists, each of whom devoted his attention exclusively to a single symptom of a single disease.

It is, however, of the period of Grecian supremacy that we can speak with more certainty of the distinction between the general practitioner and the specialist. Hippocrates was a general practitioner, so also were his followers. But there were specialists in those days. Then, a specialist was a practitioner who performed such medical functions as were improper or undignified for the general practitioner to undertake.

You will recall in the oath, older than Hippocrates but named for him, that cutting for the stone was not to be done by the general practitioner and was to be relegated to men who did such things. These men were specialists.

Nor did this attitude die with the Greeks; it was carried into Arabic medicine and intensified there especially in regard to surgery. Thus when Arabic medicine in turn was carried into Europe, we find the distinction persisting. Specialists, such as operative surgeons, were of a low class compared with the general practitioners. Surgeons were barbers. Even the great Paré of France, on occasion, wielded the razor and he did those menial things, such as operative surgery, which a reputable general practitioner would have refused to do.

Somehow, somewhere, the ancient tradition has changed a bit and we find surgery now a reasonably respectable occupation, even a dignified one. There was a time when ophthalmology was the province of itinerant quacks and mountebanks, when obstetrics was an exclusive prerogative of old women whose only requisite before the law for their specialty was to keep their finger nails trimmed. There was a time, too, when laryngology was practiced only by singing teachers. All of these specialties have now become respectable and we find even the general practitioners occasionally backsliding into specialties which were once beneath the dignity of any respectable medicine man, e.g., any general practitioner.

Tradition and custom, in *some* regards *may* have changed. The specialist may have become respectable, even exalted. In its more fundamental aspects, tradition has not altered. Back in the days in which medical traditions were created the specialist dealt exclusively with one phase of the individual's activity. The scope of the general practitioner was wider; he dealt with nearly every phase of every man's activity. He dealt with society as a whole and it is with society as a whole that public health is concerned.

We are prone to think of public health as a development of modern science. Truly its greatest demonstrable triumphs have come from the science of sanitation developed during the last hundred years. And during the same period much organization has been brought into public health endeavors. But public health work is *more* than sewage disposal, water purification, food inspection and quarantine. Such procedures, however valuable they may be, are merely means to an end. It is only the end that is Public Health itself. Public Health is the protection of our people against all environmental influences which may exercise a detrimental effect upon their physical or mental well-being. It is strictly a social field, essentially a philanthropic one; and one imposed upon the general practitioner as a duty by tradition from time immemorial. To him it is an obligation, as vague in its delineation perhaps as the very ethics by which the physician guides his conduct. Both arose from the same sources; both are nourished by the soil from which religion sprang. By tradition medicine is not a busi-

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ness, nor even a science; it is a calling, a social calling. It is only when the social duty of the physician is sensed by him and felt by the public that medicine and the physician acquire their due and proper prestige. Prestige is indispensable for the full display of the measures of public health.

Public health is not new; it is as old as the medicine man and he dates, in turn, to prehistoric times. The tradition which established the social duty of the physician is carried forward through him. The medicine man of primitive peoples was primarily a socially-minded individual. His function was to control all matters affecting the public weal. There were, on the one hand, the unseen powers that actuated the universe and, on the other, the ordinary visible people. Between these two the medicine man stood as mediator. His position was one of vast importance, of vast influence, and of vast responsibility. Because of his acceptance of the social duty he was held in the very highest prestige by his fellow men. He was a public-health worker.

With the advance of the centuries the methods of public health work have altered. Many of the duties undertaken by the early medicine man have been handed over to specialists. Wisely has he relegated his meteorological and climatological functions to perhaps better hands. The man of medicine of today fortunately is not called upon to predict rain, or interpret the blowing of the wind. Furthermore the physician has relinquished the whole field of religion which he once controlled. That step, the separation of medicine from religion, we credit to Hippocrates. Whether it was a wise step I do not know; in view of subsequent developments I rather doubt its wisdom, for the consequences of the separation were far-reaching. It tended to make the physician less active socially. As a result of the separation only the physical ailments of men were allotted to the physician; the behavioristic ailments of men and society were included in religion. An arbitrary division, one which has no real existence, was created between the flesh and the mind. Public health, as I conceive it, does not stop with the physical ills but carries over as well into the field of social ills.

If you want to see the physician as the social arbitrator between men and their environment in civilized surroundings, you need turn back only one or two generations to that cherished character now growing obsolete and about whom wishful myths are already developing, the old family doctor, a man who exerted a great influence in town life, who appeared as a paragon in medical matters, as an oracle on all subjects social and political, who was a father confessor, who was a man after whom grateful mothers proudly named their offspring, and whose limitations were known only to his wife and the town druggist.

This man was a social force. But he did not attain this eminence by science, nor yet by confining his activities to the physical ailments of the individual patient. He was active socially, he was a man of forceful personality, he took part in politics, and if I remember correctly there were six medical men who signed the Declaration of Independence, who turned their keen and trained intellects to the problems of the public welfare. Politics is today a field which fails to attract the majority of physicians. No longer are the names of the men of the medical profession found heading the lists of great and beneficent public movements. We are inclined to look back upon the old family doctor with his interest in society as one of the cherished pioneer, but rather naïve, institutions of a rugged and growing country, and class him with the horse-drawn carriage and the oil lamp, the family circle about the open fire and the prayer meeting.

With the methods in medicine that modern science has put at our command, we look in tolerant pity at the crude measures he used in diagnosis and treatment. We smile at his sallies into political activities, his concern with the domestic and social aspects of his patients. But even as we smile in mild contempt we feel a real envy for the prestige which this man held, the social control which he exercised over the community, the respect which he commanded.

His patients did not turn from him to quasi healers; they did not embrace the healing cults; they did not flock to quacks, nor did they adopt medical fads and fancies. The public respected this man of medicine, and in respecting him respected medicine. No suggestion was brought forward that the old family doctors should group together into a subsidized, socialized form of practice to become servants rather than leaders of the community. They would have looked upon such a suggestion as an insult.

These undesirable conditions came about only after medicine had much more to offer to the patient and to the public than it had in the days of the old family practitioner. It is common knowledge that during the last eighty years medical science has made amazing discoveries for the betterment of health and for the prolongation of life. Nearly all methods of so-called preventive medicine have been developed within this period.

But while the physician has advanced to overcome one disease after another, and made his science better able to fill an important function for public welfare, the prestige of the physician and the regard in which medicine is held by the public have not increased correspondingly. Indeed they seem to have declined.

Now this change in public regard has driven the physician from a position of social superiority to that of a mere scientist, and to the

American public the scientist is not a god, but only a servant. The consequences of this change go beyond matters of mere personal pride. They bring an obstacle to the advancement of medicine. If medicine is to progress, if it is to carry out its work of public health, it must be viewed with respect and sympathy and admiration. It's well enough to point to the triumphs of sanitation and show how deeply ingrained these things have become in the very minds of the people. But, as you point to that fact, let me point to another; today the vast majority of men and women die prematurely; they die of diseases which are controllable or preventable by methods already available; not sanitation or other impersonal methods, but those requiring that active and personal coöperation of patient and physician which is essentially a social aspect of medicine and is just as much public health work as sanitation itself. The statistics today show that the general practitioner has failed in this function in public health work. And one of the causes of this failure is the decline in the prestige of the physician.

Many explanations have been offered to account for it. It often is suggested that the physician in becoming scientific has taken the alluring mystery out of medicine. There was a time not so many centuries ago when the bubonic plague that so ravaged Europe was looked upon with mingled regard as an affliction from God and the contamination of the air. Under direction of physicians men prayed to the gods for relief and burned gunpowder in the streets to purify the air. Modern science has shown the disease to be due to a bacterium carried from rats by fleas. Prosaic you say. From great and powerful agencies to vermin. The mystery is gone and with the mystery the importance, the prestige of the physician. I, for one, do not believe so. It is an argument as specious as the one supporting the belief that the prestige of the old family doctor was inherent in the mystery of the bad Latin in which he wisely disguised his prescriptions.

Let us analyze a little more closely what has actually been going on to develop the gap which lies between the old family doctor and the modern general practitioner. See wherein the latter has failed to carry on the tradition of public health, the tradition that he was the supreme mediator between man and his environment. And when we have completed our analysis we shall find simply this: the public has not changed but the physician has. In becoming a modern scientist he has become less socially-minded, and, although vastly better equipped technically to do so, is less able to carry out his true function in public health work, and he desires less to do so.

The great change commenced in the latter part of the nineteenth century. At that time the sciences of mathematics and physics and chemistry were for the first time applied intensively to the elucidation of medical problems. Since then the progress made in developing new methods of diagnosis, new methods of treatment, new methods of prevention has been stupendous.

Medicine as a science has developed to an extent never before even dreamed of. But, gentlemen, while medicine altered, human nature did not change correspondingly. The real and fundamental nature of the patient whom you treat today is the same as that of the patient whom the old family doctor treated two generations ago. His problems have altered with the change in his environment, but they are as serious and as personal to him as they ever were.

Science has come in and it has told us much, but science has never and probably never will evaluate with precision the full ramifications of the human mind, of human personality, of human nature. And so long as these things remain beyond the control of the measures of science, to that extent medicine fails as a science.

In the first flush of the triumphs of the application of science to medicine, it appeared that all the problems of medicine were to be answered and that medicine at last was destined to become as exact and impersonal as engineering. But medical education changed; it adopted the precise methods of science. It built its structure on the laboratory as a foundation. Premedical education changed. For our medical schools we selected men who excelled in the laboratory sciences. We did not select men to go into medicine because of a driving desire to help mankind, socially-minded men. Quite the contrary, in the medical schools the students were trained too often by great scientists and not by great practitioners; there are few great scientists who have been great practitioners. Attention centered almost exclusively upon the physical manifestations of disease. Consequently we have developed many bedside pathologists, interested in diagnosis for the sake of diagnosis, but whose only contact with the patient is through the foot of rubber tubing on the end of a stethoscope.

And human nature cannot be interpreted or controlled through the restricted lumen of a rubber tube. Neither can social problems of medicine be solved in a flash over a Bunsen burner or even in the seclusion of a committee room. The social problem of medicine is solved by social contact.

I hesitate to say it, but the truth is, I doubt whether we now have many general practitioners, particularly in our larger cities. Rather they who occupy something of the position of the general practitioner are now inclined to call themselves internists. They are to all in-

tents and purposes specialists. It almost seems to me that we have returned to the ancient Egyptian situation where every physician was a specialist.

I have perhaps wandered far from my topic "The Functions of the General Practitioner in Public Health Work." I have indicated the functions that tradition assigned to him; I have enumerated some obstacles that have been put in his way. So far my words have been of destructive criticism. What can I say in a constructive vein? Wherein lies even a partial solution of the difficulty?

I think it lies in education. Yes, in medical education in part. But for another great part in the education of the public. In that direction lies the present work in public health. It is not in the laboratory, not in the development of new methods of treatment, cure, or prevention, but education,—education to a better understanding of medicine, to a fuller application of the measures already available. And such education means that the physician must leave his office sometime and become a factor in public affairs. Not to remain a recluse of the hospital ward or operating room, busying himself exclusively with the physical infirmities of the individual man, but, in the broader interests of mankind, giving his talents to public affairs. Fundamentally our public is guided by what it sees and not by what it hears. It will turn a deaf ear to the praise of medicine sung with the sweetest notes. But it will be influenced, and will believe and appreciate the importance of medicine when it sees the physician entering into the activities of the community and becoming a leader there.

DISCUSSION

PRESIDENT ALLEN: As I said this morning, there are no people appointed to discuss these papers, but I certainly hope this one will be discussed. I am going to ask Dr. Dalton to open the discussion.

DR. DALTON: Dr. Ricker told me that Dr. Haggard would present a very wonderful paper and his prognostication has proved to be correct.

The doctor has said a great many things I would like to say if I had the ability to do so. In my experience most doctors are public health workers. They are so whether they wish to be or not, and the true reason is that the public has received so much medical information through the doctors and through articles in papers and journals, that the doctor himself must maintain his efficiency in public health matters and give advice respecting preventive medicine.

I have had the privilege of meeting men from different parts of the country, and learning of the attitude toward public health work, but I have yet to find a state where physicians are as coöperative in public health work as they are in Vermont, and that is very much appreciated.

While the private physician must necessarily engage in preventive work, there must be some public health department supported by the state or town or city, in order to take care of those things which affect the mass rather than the individual; that is a public function. I appreciate this paper and have enjoyed it, and hope Dr. Haggard will come and talk to us again.

DR. WHITNEY: It seems to me that when a physician is called to a home to treat a case, he should improve the opportunity to look around and see if some other members of the family may not need medical oversight or supervision. His apparent interest in so doing will add to his prestige and it will be along the lines of preventive medicine. I think that this is one of the opportunities that the younger men do not appreciate. Too many of them are apt to look upon medicine as a commercial venture rather than a humanitarian vocation.

PRESIDENT ALLEN: I should like to hear from some of the younger members as well as the gray-headed ones. Perhaps we have become so impressed with the truth of what Dr. Haggard has said that we think it admits of no arguments and requires no discussion.

I wonder if Dr. Haggard realizes that probably in few states, at state society meetings, could he talk to so many representatives of what he considers the fast disappearing school of old-fashioned general practitioners. Vermont has a lot of them and she is very proud of them. I wonder, too, if the doctor realizes that in 1777, when Vermont proudly announced herself, by declaration, to be a free and independent nation, that that declaration was signed by four doctors. So, in those days, and I think in the present, the doctor played, and still plays, an important part in the social life of this little state.

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH

JANUARY, 1934

During the month of January, 200 cases of chicken pox, 4 cases of diphtheria, 240 cases of measles, 50 cases of mumps, 82 cases of scarlet fever, 10 cases of typhoid fever, 3 cases of undulant fever and 187 cases of whooping cough were reported.

The Laboratory of Hygiene made 1,487 examinations in January, classified as follows:

Examinations	for	diphtheria bacilli	122
"	"	Widal reaction of typhoid fever	45
"	"	undulant fever	32
"	"	gonococci in pus	129
"	"	tubercle bacilli	202
"	"	syphilis	495
"	of	water, chemical and bacteriological	15
"	"	water, bacteriological	192
"	"	milk, market	140
"	"	milk, submitted for chemical only	1
"	"	milk, submitted for microscopical only	17
"	"	foods	1
"	"	drugs	2
"	for	courts, autopsies	1
"	"	courts, miscellaneous	28
"		miscellaneous	64
Autopsies	to	complete death returns	1

Twenty-nine cases of gonorrhea and twenty-six cases of syphilis were reported to the Division of

Communicable Diseases. Six hundred and seventy-three Wassermann outfits and 481 gonorrheal slides were distributed.

The nurses of the Poliomyelitis After-Care Division made seventy-one home visits to patients, consulted eight physicians and made ten social service calls in January. Four patients were admitted to the Audubon Hospital, three patients were discharged and one patient was discharged from the Children's Hospital in Boston. Fifteen pieces of apparatus were altered and fifteen orthopedic corrections made to shoes. The vocational worker reports sales in January amounting to $106.70.

The State Advisory Nurse visited several towns to assist community gatherings and P. T. A. meetings. Much of the time this month was devoted to the Civil Works Service project for giving work to unemployed nurses. Two hundred and seventy-two notifications of birth registrations and 1,499 pieces of literature have been sent out.

MEDICAL PROGRESS

PROGRESS OF GASTROENTEROLOGY IN 1933

BY A. E. AUSTIN, M.D.*

THE usual investigations with regard to secretion, pathology, etiology and treatment have been pursued in 1933 and will be taken up under the organ in question.

STOMACH

Hofstein[1] has investigated the action of insulin on gastric secretion by means of fractional withdrawal with a permanent tube.

First, all the secretion which the stomach contained is withdrawn and then the patient receives an intramuscular injection of 16 units of insulin; in order to avoid the possibility that the presence of the tube alone could augment the acidity of the gastric juice, controls without the use of insulin, were employed; in no case was the acidity increased.

In all instances the insulin one hour after injection caused a marked increase in the hydrochloric acid with an extreme sensation of hunger. In those affected with anacidity or achylia, the insulin produced the sensation of hunger but no hypersecretion.

Since histamin has been used to such an extent in arousing the secretion of gastric juice in those suffering from achylia, Szemzö[2] after four unfortunate experiences in its use warns against a too indiscriminate employment of it. His patients in whom it had been injected suffered from headache, extreme suffusion of the face and one, even an urticaria and shock.

He does not regard the histamin test as of any value as distinguishing between disease accompanying achylia, i.e., gastritis and those diseases causing achylia, such as essential anemia and cancer.

Histamin gives no information as to the character of the achylia, its severity or prospects of restitution of the secretory powers of the stomach. Histamin can be replaced by insulin or substances to be ingested like alcohol or caffein and the latter ingested substances give a much better view of the cause and severity of gastric anacidity.

Pfaffenberg[3], noting the decided relief obtained by those afflicted with "hyperacidity" in the use of alkalis and absorbent materials, made tests with different forms to determine whether the neutralization was temporary or whether the gastric secretion was actually reduced by this means.

With the tube constantly in the stomach after 300 cc. of tea were taken, portions of gastric juice were withdrawn at intervals of ten minutes, until the normal acidity was determined.

Then in the same individuals in conjunction with the tea, the more common of the heavy alkalis were taken and the acidities compared with the former.

In every instance there was a temporary fall of the acid curve, followed almost immediately by a return to the former peak; hence these alkaline substances do not diminish permanently the acid-secreting power of the stomach which seems bound to maintain a certain level of acidity. The therapeutic significance of these heavy alkalis is not changed by these experiments; they serve only for temporary relief.

Secher[4] has studied the relation in 33 men and 149 women, of the so-called small heart or cor pendulum and gastroptosis which are so often found in the same individual. These were all of the narrow-chested, slim type; no woman was over 26 and only three men over 30; of 55 women under 30 years of age, 42 had never borne children.

Hence the condition described must be regarded as congenital. Upon measurement of the transverse diameter of the heart, it was found that practically all of the young women were far short of the average.

Hence the author concludes that a small heart and gastroptosis are generally found in the same individual. The men with this syndrome are always underweight as compared with their height and remain so during subsequent years.

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As age progresses, the narrow chest enlarges and at 40 or after, the heart reaches its normal horizontal dimensions; many of the possessors of the ptosed stomach have no gastric symptoms. Sinek[5] calls attention to a combination of achylia or hypochlorhydria and lack of hemoglobin in the erythrocytes but without the gross change in size of the globules as is found in essential anemia with the accompanying increase of urobilin in the urine and nervous symptoms such as paresthesia, loss of reflexes, etc.

This condition, or syndrome, or Biermer's disease is benefited both by liver and arsenic by which the hemoglobin of the blood as well as the hydrochloric acid of the stomach is increased.

Iron has also proved most efficacious in combating this disease, but must be used in large quantities, as three to five grams daily.

That foods contain enough chlorine naturally to produce active gastric juice has been proved by Unverricht[6].

Patients were fed from ten days to ten weeks on this salt-free food, viz., raw fruit, vegetables, eggs, milk, cream and olive oil.

From time to time gastric contents were withdrawn by the fractional method and titrations for hydrochloric acid and tests for pepsin were made. The free and total acids of the gastric juice remained normal as did the pepsin, even after long periods, on this diet.

Hence he thinks that it is proved that the hydrochloric acid of the gastric juice is not dependent on the sodium chloride added to food. Hence, whenever the accumulation of sodium chloride in the body is too great, this diet is advised.

Reschke[7] urges more frequent use of surgery in checking severe gastric hemorrhage from ulcer; at least 5 per cent will die without operative intervention and if the operation can be performed within 12 hours after bleeding begins, the chances of recovery are good.

Another great aid according to the author is a preliminary transfusion which sometimes in itself checks the bleeding, but, if not, puts the patient in a vastly better condition for the operation.

That transfusion and resection will save many patients, otherwise doomed, is the conclusion of the author.

Morton[8] analyses the records of peptic ulcer in the University Hospital at Charlottesville, Va. which deals with a farming population including some Negroes whose diet is generally coarse and of nonalbuminous character, and compares the medical and surgical treatment of peptic ulcer.

The material comprises 220 cases of duodenal and 66 of gastric ulcer, in more than half of whom symptoms had persisted more than two years.

Medical treatment was employed in 196 cases and surgical in 90. Six deaths occurred in the hospital among those treated medically and eight of those surgically treated. Of those discharged, a total of 272,190 had had medical and 82 surgical treatment. A questionnaire sent to each of these produced 164 replies, most of which came from patients who had been treated from two to twelve years before. Of the medically treated, about one half living had obtained satisfactory results; of those surgically treated, all of those with gastric and three-fourths of those with duodenal ulcer had obtained excellent results. This shows that there was definitely more complete relief from surgical than medical treatment.

Furthermore, those medically treated were compelled to indulge in a fairly strict diet and employ alkalis while the others ate pretty nearly what they chose. Moreover three of the former group died of gastric cancer and many had eventually to return to the hospital for operation.

Konjetzny[9] combats the possibility that the gastric juice has the power to corrode or digest the gastric mucous membrane. He is quite convinced that the elimination of toxic material by the stomach starts the gastritis and quotes two cases where this happened, one of psoriasis and one of an appendiceal abscess.

Such a gastritis may lead to polypous formation and, if about the pylorus, obstruction may take place and an operation prove necessary. He is also convinced that many, if not all, gastric ulcers are preceded by this condition of gastritis. Gastritis, too, may cause symptoms so similar to those of gastric or duodenal ulcer that mistaken diagnoses are made.

Disturbed by the fact that some of his patients became infected and died of peritonitis when every possible antiseptic precaution had been observed, von Haberer[10] has sought at the autopsy for any other sources of infection and thinks he has found it in the lymph ducts which must necessarily be severed in any extensive abdominal operation.

In 1041 resections of the stomach and duodenum, this form of infection has occurred three times so that its rarity is established.

The author's opinion is that, when any suspicion of infected lymph ducts exists, the site of operation should be surrounded by drainage tubes or wicks. These should be left in the wound and no complete closure attempted.

Basing conclusions on 131 duodenal, 45 gastric and 5 gastrojejunal ulcers, Scrotson[11] proceeds to analyze the history of these cases and offers suggestions for treatment. From statistics it is proved that perforation of a peptic ulcer is much more likely to occur in males than females, and the existence of previous symptoms of ulcer may be from two weeks to 40 years. The agonizing pain and boardlike ri-

gidity of the abdomen, together with pain in the shoulder tip, usually differentiate the perforation of a peptic ulcer and that of the appendix.

Of the 181 patients operated for perforated peptic ulcer, 31 died making a mortality of approximately 17 per cent. It was found that the deaths from perforated gastric ulcer were more than twice that of duodenal. The further history of 92 of these individuals three and one-half years after operation showed that 42.39 per cent had no further symptoms; that 38.04 per cent had slight discomfort and 19.57 per cent had severe symptoms or a subsequent operation.

It was also shown that suture plus gastrojejunostomy gave a much lower mortality than the former alone. The author urges early operation and restricted diet with alkalis long after the operation.

Ritter and Keller[12], in order to verify the belief that there is a peculiar tendency in certain families to acquire ulcer of the stomach, have examined 378 cases of the same and found in eight, or 2.12 per cent, who were operated and diagnosis assured, a history of other members of the family who had suffered from ulcer.

In five families it was found that three to five members ranging through three generations had suffered from gastric or duodenal ulcer. The authors are inclined to attribute this frequency of ulcer in these families to a neurotic origin, since neurosis almost always accompanied the ulcer.

Hyperacidity while found was not a general characteristic in all the families, nor was there any uniformity in the site of the ulcer. On account of its rarity, this familial disposition to ulcer is not regarded of very great importance.

DUODENUM

Baumstark[13] reports two cases of duodenal diverticulum and makes suggestions as to means of diagnosis. First as to symptoms; both patients complained of periodic pain in the upper abdomen and especially in the right or left hypochondrium. Relief of pain occurred on change of position as lying on the abdomen or on the right or left side. Attacks of fatty diarrhea, abdominal distention, loss of flesh and often severe headaches occurred. When these symptoms are present and no other cause can be found in the abdomen, recourse to roentgenology should promptly be had. Associated inflammation of the pancreas probably accounts for the fatty stools. Treatment should be largely dietetic and recourse should be made to surgery unless complications are present.

Hammelmann[14] calls attention to the difficulty of diagnosis of granulomata of the duodenum and describes an invagination ileus from a lympho-granulomatous tumor in the upper jejunum. This man of 48 had been under treatment for a year on account of a supraclavicular tumor which was found to be a lymphogranuloma.

There was no digestive disturbance until the end of the year when the patient was suddenly attacked by abdominal crampy pains, vomiting with retention of stool and gas. A tumor was detected just to the left of the navel. An intense application of Roentgen rays was first tried and proving of no avail, operation was performed and 30 cm. of duodenum was found invaginated into the jejunum at the apex of which was a tumor, the size of a hen's egg which proved to be a lymphogranuloma.

The growth with 40 cm. of intestine was resected. Recovery from the operation was uneventful but the patient afterwards died of a lesion of the cord, probably of a similar character, with complete paralysis of the lower part of the body.

PANCREAS

Sebening[15] first emphasizes the relation of the biliary tract diseases to pancreatitis and explains the connection as either due to obstruction by stone at the ampulla of Vater which forces bile into the pancreatic duct or the entrance of bacilli. The history of previous attacks of gall stone colic confined to the right side and with the pain in the present instance extending to the left side and persisting there should arouse at once suspicion of pancreatitis.

In 80 per cent of all cases of pancreatic necrosis coming to operation at the Frankfort hospital, there was a history of previous gall stone colic. The fear that cholecystectomy may lead to pancreatic disease is dispelled by the fact that among 1284 cases of operation for pancreatic necrosis only four had previously had their gall bladders removed.

The most important thing is early operation as very severe cases often die within 24 hours of onset. The author emphasizes the importance of restriction of carbohydrates for at least a year in the diet of those surviving the operation.

LIVER

Farmakidis[16] discusses a condition of the liver which demonstrates itself by gross enlargement, often without jaundice or known cause. After quoting six cases with history he divides the cases of enlargement of the liver into two classes; where the cause is known, typhoid, septicaemia, malaria, etc., and the unknown; in the latter class he places these enormous hypertrophies of the liver where the most careful examination fails to discover its etiology. Failing any laboratory verification, the author surmises that this enlargement is due to toxins produced by bacillary invasion. He further thinks that this condition is an entity and should be granted a place in pathology.

Barchasch[17] reports two cases of severe jaun-

dice and shows the difficulty of diagnosis; the one began as an ordinary catarrhal jaundice and three and one-half weeks later assumed all the characteristics of acute yellow atrophy which was shown at autopsy; the second case of severe jaundice began like the former but lingered and one and one-half months after the beginning of his illness acquired a marked ascites and an ordinary hepatic cirrhosis was established. The autopsy, however, showed both cirrhosis and acute yellow atrophy. From these cases the author draws the conclusion that for severe jaundice neither an angiocholitis nor obstruction of the ducts is necessary since bilirubin can be formed outside the liver.

The pathology of all forms of jaundice from catarrhal to acute yellow atrophy, is chiefly in the liver cells with physiochemical changes therein ranging from hepatitis to necrosis. Since so little is known about subacute yellow atrophy of the liver, this condition may be assumed when severe jaundice is present, accompanied by sudden ascites, hemorrhage and enlarged spleen though there is no disturbance of the nervous system.

Seide and Geller[18] have studied 35 cases of primary cancer of the gallbladder to determine what influence, if any, the presence of gallstones has exerted on its causation. In 17 of those operated for supposed cholelithiasis, cancer of the gall bladder was found, making 48.5 per cent.

It was noted that cancer associated with stones is much less common in men than in women, of these one half had suffered from gall-stone colic from one year to several years before the carcinoma was discovered while the others had had cholelithiasis only a few months. Their conclusions are that there is a close connection between the two diseases; that the percentage of women with this combination is much greater than that in men. In view of the fact that women are much oftener the victims of cholelithiasis, this speaks rather against the cancer being due to the irritation of stones and rather that the cancer aids the formation of stones.

The fact that two thirds of the patients experienced the pain due to stones almost coincidentally with the diagnosis of gall-bladder cancer, points to the cancer as primary and the stones as secondary.

v. Friederich[19] reports on 1500 cases in which practically all the known tests, examination of urine, bilirubin in blood, liver function test and roentgenology were employed and compared with the results from the introduction of the duodenal tube. In 27 per cent of the cases no filling of the gall-bladder was detected though the dye was given intravenously; in only four per cent were positive stone shadows found; in 22 per cent negative stone shadows were detected and in 30 per cent both.

When these latter are found whether positive or negative, the author concludes that positive diagnosis of cholelithiasis can be made and all other tests are superfluous.

When, however, no stone shadows are found, then an examination of the bile procured by means of the duodenal tube is necessary. The reflex was studied by the three methods, employment of peptone, magnesium sulphate and pituitrin; with all methods, the reflex was positive in 25 per cent and negative in 75 per cent.

The author's conclusion is that a positive reflex does not exclude the presence of gallstones while a negative reflex may have several causes of which a stone is one. In 54 per cent of the individuals examined, the gallbladder was not visible by cholecystography and in only six per cent of these could a duodenal reflex be elicited.

Among his conclusions are the following: the use of the duodenal sound alone cannot lead to a correct diagnosis of cholelithiasis; while cholecystography is much more valuable since it leads often to a positive diagnosis of stone in the gallbladder, the use of the sound should not be dispensed with as it often adds to the findings of roentgenology. Kopstein and Popper[20] have studied the nerve control of the gall-bladder by means of cholecystography. Such drugs as adrenalin, ephedrin, ergot, pilocarpin and atropin were used to either excite or paralyze the sympathetic or vegetative nervous system.

The first picture was taken 13 hours after the contrast material was ingested, the drug injected and 30 minutes later another picture taken. In every case the shadow remained of the same size so that it was impossible by any of these drugs to so excite or paralyze the sympathetic or parasympathetic nerves that their influence on the motor power of the gall-bladder was affected.

Then the same drugs were employed after the patients had taken the yolk of two eggs. After the use of ergotamine tartrate, it was found that the motor activity of the gall-bladder was slowed and the fat stimulation (egg yolk) suspended. Atropin had no effect.

Hence from a practical point of view in the clinic, if we wish to check the motor activity of the gall-bladder, we should use ergot and not atropin.

In a mass of 15,000 autopsies Ehrmann[21] has made a careful study of the incidence of cholelithiasis and gastric ulcer; of the former he found six per cent of all sections of men and 16 per cent of women. The incidence of gall-stones increased very rapidly after the war, which fact he attributes to the large quantities of coarse fats taken by the people starved during the war.

These fats consisted largely of stale American bacon, a poor quality of lard and margarine. The existence of cancer of the gall-bladder and acute pancreatitis he regards as the result of gall-stones and found a large increase in the number of the latter. Of 7000 patients

with ulcer of the stomach or duodenum, 800 came to autopsy.

While men were preëminently the victims of ulcer before the war, the increase in women after it brought them almost to an equality. The site of these gastric ulcers is usually in the lesser curvature and their increase in women was undoubtedly due to the coarse nature of the food which was very bulky and had little nutritive value. Since the return of a normal diet the occurrence of these ulcers has been much less and the predominance of males has returned. During the activity of the ulcer a thickening of the mucous membrane of the stomach, and acute gastritis exists. This disappears after the ulcer is replaced by scar tissue. Ehrmann does not believe that ulcer becomes cancer except in rare instances. In fact he declares that ulcer protects one from cancer. From the statistics of the hospital, he found that ulcer was a disease of the lean or half-starved years and cholelithiasis of fat years, that is the return of prosperity.

APPENDIX

Thom[22] distinguishes three forms of chronic appendicitis, first, chronic intermittent in which at intervals pain is felt in the right lower quadrant with relief between attacks; secondly, the remittent form beginning with a short sharp pain which becomes quiescent after a long period of rest followed by a return of the pain and, thirdly, a primarily chronic form with a constant dull ache over McBurney's point. In 28 cases in these categories in which roentgenology showed no filling of the appendix, or the shadow showed marked distortion, because of refusal of operation by the patient, the author employed injections of ten to twenty per cent calcium chloride in amounts of 10 cc. at first daily and then every other day. After from ten to fifteen injections, the patient is usually free from symptoms. In general the x-ray showed no change in the pathological condition after treatment but in three cases an invisible appendix appeared in normal contour. By mouth the action of the calcium is much inferior to the intravenous administration.

INTESTINES

Hepburn, Eberhard, Ricketts and Rieger[23] collaborated in determining the temperature of the gastro-intestinal tract under normal conditions and then studied the effect of the ingestion of hot and cold foods and drinks, also that of the local application of cold to the abdomen, and various forms of heat.

The thermometer was introduced into the stomach, jejunum and sigmoid and its actual position determined by the fluoroscope. In 129 men, the average gastric temperature was 99.2°; in 128 women, the average gastric temperature was 99.4°.

It was also found that during the period of investigation varying from one-half to three and one-half hours, the temperature may vary in the same individual as much as 3.5°; the jejunal temperature was approximately the same as the gastric, the average difference being less than 0.1°. The sigmoidal temperature was always higher than the oral, on the average, by 2.9°.

With 250 cc. of ice water taken internally, there was a rapid fall of temperature followed by a rise, rapid at first and then more gradual until a horizontal was reached, lasting at least ten minutes. This was regarded as the final change and was usually 0.2° below the temperature preceding the ingestion of the ice water. The recovery time averaged from 38.1 to 39.8 minutes. With 90 grams of ice cream, the graph was very similar to that obtained by the ice water except that the initial drop was not so great. The magnitude of the drop in gastric temperature was proved to depend upon the temperature of the ice cream and the speed with which it was eaten. With a cup of hot coffee, the gastric temperature rose rapidly, descended as quickly for a short period and then more slowly; the total rise varying between 4.2° and 17 degrees and the recovery time between 9.9 and 45 minutes. The application of hot pack, hot water bag, electric pad or infra-red lamp produced no change in the intragastric temperature. The application of an icebag to the abdomen produced a decided drop in the temperature of the stomach and upper intestine, but produced no change in the sigmoid temperature when applied to that part of the colon.

It has been well established that gastric secretion and motility are increased during the catamenia in women and hence such examinations at this time are faulty but Halter and Pape[24] have made a study of intestinal activity during this period.

Laying aside the subjective history in which it was found that twenty per cent of 191 women who complained of constipation returned to normal movements during menstruation, 15 cases were examined by the fluoroscope at six to twelve hour intervals during the menses after 80 grams of barium had been ingested. Of these, five showed little change of motility in the colon while eight showed a marked increase in motility while in two cases, peristalsis of the colon was lessened. For control, the same examination was made from twelve to fourteen days after the menstruation had ceased.

Two explanations are offered, first the ovarian hormone is in excess during the menses which acts on the muscles of the intestine, and secondly, a sympathetic contractility of the intestine such as exists in the uterus during the catamenia and childbirth.

Owing to the rarity of intestinovesicular fistula, Willan[25] reports six cases of which one was

a tubercular adhesion between the small intestine and the bladder, one a perforative diverticulum of the colon, two malignant growths of the lower end of the pelvic colon while two others were urinary calculi ulcerating into the rectum.

In all cases passage of feces and gas through the urethra established the existence of this condition while other investigations showed the cause. All cases except cancers of the rectum were operated with successful results.

Ligat and Overend[26] call attention to the fact that the condition of volvulus of the pelvic colon is neglected in medical literature and report 12 cases. These may be divided into three types according to symptoms; first, severe and continuous constipation with some aching in back or abdomen; secondly, severe spasmodic pain and distention of the abdomen; and thirdly, an aggravated type of the former where we have distended veins and watery discharges, often blood-stained. The discharges after the pain which may be severe are the most distinctive feature of the volvulus.

The most satisfactory method of examination is the fluoroscope after an enema of barium and tragacanth by which the contour of the colon can be studied. The barium is then evacuated and a careful inspection of the mucous membrane is made. This is followed by fractional inflation of the colon by air to determine its anatomical relationships.

Ligat and Overend conclude that recurrent sigmoid volvulus is not a rare but a frequent cause of obscure symptoms.

The most satisfactory treatment, after diagnosis is established, is removal of the redundant loop. If the victim is a bad surgical risk, colonic irrigation and a suitable diet with the least possible amount of residue must be adopted.

After emphasizing the difficulty of the diagnosis of tubercular peritonitis, Saegesser[27] offers a new aid to the clinical and other physical signs in the shape of roentgenological examination.

While ordinarily the ileum is free from the contrast material in from six to eight hours, in this disease it can be found many hours beyond this period. In 23 out of 36 cases studied, a laparotomy confirmed the diagnosis based largely on the x-ray findings. Another feature is the irregular distribution of the barium in the ileum, some coils being fully distended and others empty. This unequal distribution is much more marked in proportion to the size of the adhesions but even in the exudative form, this delay and unequal distribution are noted.

Only two conditions have been found which confuse these findings, cancer of the omentum and ileocecal tuberculosis.

Finally while this six-hour appearance is not always present in tubercular peritonitis and may appear rarely in other conditions, it is of the greatest assistance in establishing a diagnosis.

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CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
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CASE 20111

PRESENTATION OF CASE

A sixty-eight year old American caretaker entered the hospital complaining of jaundice, nausea and abdominal pain.

For a month the patient had felt constantly fatigued but not really ill. At about the time when this sense of fatigue developed he noticed jaundice, which rapidly deepened in intensity for several days and then slowly began to diminish, but had not entirely cleared at the time of admission. During the period when the jaundice was most intense the stools were clay colored, but for the past two weeks they had again been light brown to normal in color. During this entire period there had been a rather constant dull ache in the lower abdomen, with two attacks of sharp upper abdominal pain which radiated backward to the angle of the left scapula. Throughout the period of illness there had been rather frequent mild headaches and he had been nauseated often, but vomited on only one occasion and thought that at this time the vomitus contained bile since it was extremely bitter in taste. At no time during the present illness had the patient felt really ill: he did not consult a physician until two days before entry to the hospital.

Eight years before admission he had one severe attack of upper abdominal pain lasting several hours. He had no jaundice at the time, but was told by his physician that he had probably had a gallstone attack. He had had the usual childhood diseases, including scarlet fever and an illness diagnosed as malaria. Typhoid was denied. Two years before entry he had difficulty of an undescribed nature in his right leg and was told that he had had an embolus.

The family history and marital history are non-contributory.

Physical examination showed a well developed, moderately obese man with deep jaundice of the skin, sclerae and mucous membranes. The pupils were equal and reacted to light and distance. The fundi were not examined. The teeth were false. The tongue and throat were negative. Lymph nodes were felt in both axillae. The chest was normal in shape, symmetrical, and showed equal expansion on both sides and no abnormalities on auscultation or percussion. The apex impulse of the heart was not felt, but the lower border of dullness was within normal limits. The action was regular and the sounds were of good quality; no murmurs or thrills. The aortic second sound was equal to the pulmonic second. The pulses were equal and synchronous, of normal volume and tension. The radial arteries were palpable, the temporals and brachials tortuous. The blood pressure was 140/75. The abdomen was entirely negative to palpation. The liver edge could not be felt. Rectal examination was not done. The reflexes were normal.

Laboratory examination of three urine specimens showed gravities of 1.012-1.024. All contained the slightest possible trace of albumin and bile in moderate amounts. The sediment showed small numbers of red cells and rare hyaline and granular casts. Blood: hemoglobin 75 per cent, red cell count 5,000,000, white cell count 9,000, polymorphonuclears 54, lymphocytes 33, mononuclears 10, basophiles 1. The red cells showed moderate achromia and slight variation in size, rare stippled cells. One stool was formed, brown in color, guaiac negative. A test for bile was slightly positive. The icteric index was over 100 on two occasions. The van den Bergh was 27 milligrams; whether direct or indirect reaction is not recorded. The Hinton test was negative.

The day after entry a barium enema showed no definite variation from normal in the colon. There was slight spasm of the rectosigmoid, but no definite diverticula were visualized. The appendix was well filled and not remarkable. There were no areas suggesting stones in the region of the gall bladder. Three days later a barium meal was noted to pass down the esophagus with slight delay at the cardia. The stomach was high and transverse. There was slight displacement of the antrum upward toward the diaphragm. There was definite delay in the passage of the barium into the duodenum. The patient had to be placed on his right side for twenty minutes before the barium could be forced through the duodenal loop. There was no evidence of intrinsic disease in the esophagus, stomach or duodenum. There did however appear to be a pressure defect involving the duodenum, but no definite mass was palpable.

Throughout the period of observation the patient was afebrile, the pulse 80-90, the respirations 20. Several donors were tested for compatibility and the patient was prepared for operation on the morning of the eighth day.

X-RAY INTERPRETATION

DR. WILLIAM C. MARTIN: The film on the right shows the fundus of the stomach, which is not displaced with respect to the left diaphragm. The other film shows that the antrum of the stomach is displaced upward toward the diaphragm and is associated with an en-

larged duodenal loop. However, the medial edges of the duodenal loop do not show any evidence of a pressure defect in the region of the head of the pancreas. These findings are found in large patients with small livers, and are not considered of any importance with regard to the head of the pancreas. The only variation from the normal noted in the gastrointestinal examination was the marked delay in the passage of barium through the duodenal loop. The small liver and the slight increase in the soft tissue shadow in the region of the spleen are consistent with the x-ray findings in cirrhosis of the liver, but special films taken for the relief of the mucosa of the esophagus show no x-ray evidence of esophageal varices.

Conclusions: The x-ray examination revealed no diagnostic findings either for carcinoma of the head of the pancreas or cirrhosis of the liver. The only positive variation from the normal that was found was the extreme delay in the passage of barium through the duodenal loop.

Differential Diagnosis

Dr. William D. Smith: When I read this case over I made a mental note that it was either ridiculously easy or a case that I could not diagnose at all. Probably we all think we know what the patient has. You have heard the history; all I can do is to run through it and make a few comments.

The patient is sixty-eight years old. He is in the cancer age, the gallstone age; perhaps a little old for mild hepatitis of such a type as catarrhal jaundice, but he might have it. He has had jaundice for a month, together with fatigue. The jaundice rapidly deepened in intensity and then began to diminish, but had not entirely cleared up at the time of admission. The record suggests that it had diminished. If we know it had diminished it is hazardous to make a diagnosis of malignant obstruction. I hesitate to make a diagnosis of malignancy if I am sure that the jaundice has waxed and waned. On the other hand the patient's own observations are unreliable, and when we get to the physical examination we wonder if the jaundice has diminished much.

When the jaundice was most intense the stools were clay colored—obstruction of course,—but for the past two weeks they had been light brown to normal in color. If that is true it is against malignant obstruction. It would be interesting to know what the patient had been eating or what drugs he had been taking. I at one time deceived myself by giving a patient grape juice. He showed me a dark colored stool and he was so much encouraged that we had to give him grape juice until he died because we could not discourage him again.

During this period the patient under discussion had pain in the lower abdomen. I do not know why he should have had pain down there. He had two attacks of pain in the upper abdomen radiating to the right scapula, typical of gall bladder or gallstone pain. It is worth remembering that a patient with cancer or malignancy in that region can also have pain that radiates into his back. It is not uncommon.

"Mild headaches" does not mean much.

The fact that he did not call a physician for his attacks of pain suggests that he did not have intense gallstone colic.

I did not understand that this illness diagnosed as malaria occurred in childhood. According to the wording of this history it might have occurred later. If so, there is nothing to say except that he may have had intermittent chills and fever or intermittent Charcot's episodes due to gall-bladder or gallstone disease. I do not believe he had embolism. Of course visceral cancer may give thrombosis in the legs, but there is not much evidence that he had cancer of the stomach.

The physical findings are surprisingly negative. Lymph nodes were palpable in both axillae. We are not told how big they were. I think we can ignore them.

The abdomen was negative. I do not know whether we can assume that he had a small liver. It would be helpful if we could. We can assume that it was not very big. We might assume that he did not have a dilated gall bladder such as we should like to find if he had cancer at the head of the pancreas.

He was apparently intensely jaundiced, in spite of the fact that he said that he "had not quite cleared up when he came in." I should assume, because I want to assume it, that the jaundice did not clear up. He perhaps saw himself in different lights and thought it had cleared up.

The urine is not important. There is some kidney irritation probably. There is a trifling degree of secondary anemia, again not significant. The normal white cell count and the low polymorphonuclear count might help us to believe he did not have an infectious process.

I think from the history alone, without knowing any more, we would be very suspicious of stone in the common duct. I think that as we read the physical examination and laboratory findings we feel less certain about it.

One thinks of various things, of the possibility of malignant lymphoma, of metastatic carcinoma with obstructive jaundice, caused by enlarged hilus glands. One thinks of a liver necrosis, but it seems to me that after a month he is not ill enough to have a really severe hepatitis in the way of marked liver necrosis or acute yellow atrophy. He has no hemorrhages, no petechiae, no stupor or other central nervous system symptoms. One might stretch a point and talk about chronic gall bladder disease and chronic pancreatitis, but I think those things most of us will dismiss. Cirrhosis does not seem to me probable.

The differential to my mind is most probably between stone or malignancy, perhaps cancer of the head of the pancreas. I do not believe the surgeons were quite sure, though they prepared him for operation. If they had been sure they might still have operated, because they might have considered the possibility of doing an anastomosis between the gall bladder and the duodenum or the small intestine. I think however on all the evidence one may say that he probably had malignancy, that he had a tumor in the region of the pancreas distorting the stomach and duodenum, and that on the law of chances it was very likely to be a tumor of the pancreas.

DR. TRACY B. MALLORY: Dr. Means, have you any thought on this?

DR. J. H. MEANS: I think I would put cancer of the head of the pancreas first. It would perhaps have been still more likely if they had felt the gall bladder.

I should like to comment upon one thing that Dr. Smith said. The waxing and waning of jaundice does not exclude cancer of the head of the pancreas. I had supposed at one time that it was strong evidence against it, but I can recall a young man who had jaundice which became complete, then entirely disappeared, then came back again. We thought he must have a stone. He did not. He had cancer of the head of the pancreas. That made quite an impression on me.

DR. SMITH: I might have amplified that statement. I have known cases such as Dr. Means mentions, but they are so unusual that I will not make the diagnosis if the jaundice does wax and wane. You might have enlarged glands and an inflammatory condition on top that might increase the size of the glands with a good deal of obstruction, as you do sometimes in annular cancer of the intestine; but I have never been willing to make a diagnosis in the face of jaundice that clears up. I think I shall be right a great many more times than wrong.

DR. MALLORY: Have you anything to add, Dr. Jones?

DR. CHESTER M. JONES: I do not see how one can add anything. As a matter of fact the diagnosis does not interest me. I think it is more important to make a decision as to whether or not the patient should be operated upon. I think with the amount of pain he had he should be operated upon in the hope of finding stone in the common duct.

DR. MALLORY: Would you like to say a word, Dr. Leland?

DR. GEORGE A. LELAND, JR.: I agree with Dr. Jones. I think the important thing is a decision for or against operation, and let the diagnosis be made at that time.

FURTHER HISTORY

Under spinal anesthesia, which in the later stages of the operation was supplemented with gas-oxygen-ether, a right paramedian incision was made and the abdomen explored. No excess of fluid was found. There was no evidence of metastatic malignancy. The large intestine, the stomach and the small intestine were normal to palpation, as was also the body of the pancreas. The foramen of Winslow was patent. The gall bladder was greatly distended, to the size of a large pear, but was not adherent. No stones were palpable. The liver was rather small, abnormally firm, and suggested an early cirrhosis. In the region of the ampulla of Vater a small mass could be felt which appeared to lie within the wall of the intestine rather than in the head of the pancreas. It was thought at first to be a carcinoma of the ampulla of Vater. Transduodenal exploration did not permit of visualization of the tumor but enabled careful palpation, and it was now believed that the mass consisted of inflammatory infiltration or possibly non-malignant tumor. It appeared to be about three-eighths of an inch in diameter and three-quarters of an inch in length and seemed to extend upward along the common duct. It was felt that a cholecystduodenostomy should give relief of symptoms and of jaundice, and this was done. During this period of the operation a finger was passed through the pylorus, which was found tight and spastic, but no anatomic lesion was present. It was therefore felt that the gastric retention was probably due to spasm and gastro-enterostomy was not considered.

Following the operation the patient's temperature rapidly climbed to 104°, the pulse to 140, the respirations to 35. Two transfusions of 500 cubic centimeters of blood were given without appreciable benefit. He died thirty hours after operation.

CLINICAL DIAGNOSES

Carcinoma of the head of the pancreas.
Obstructive jaundice.
Postoperative hemorrhage.

ANATOMIC DIAGNOSES

Subacute yellow atrophy of the liver.
Jaundice.
Chronic pancreatitis.
Partial obstruction of the common bile duct.
Arteriosclerosis, coronary, splenic and renal, moderate.
Prostatic hyperplasia, slight.
Operative wound, cholecystduodenostomy.

Pathologic Discussion

Dr. Mallory: At autopsy we agreed in part with the surgeon's findings, though not entirely. The liver was quite small and to our minds was soft rather than firm, and the sections suggest a fairly recent atrophy which has gone on to the stage where it is fair enough to call it cirrhosis, but a process of not very long standing. The degree of fibrosis is not particularly great and the scar tissue between the hyperplastic nodules of liver tissue is still vascular and soft.

The common bile duct showed an area of thickening which was soft in character. It seemed to be inflammatory. I personally did not feel that it was an important element in the case, and I felt that most of the jaundice and of the symptoms came from the very marked degree of liver damage.

This group of cases I think is a very important one, because, as Dr. Jones put it, the diagnosis did not perhaps make so much difference as the question whether or not the patient should be operated upon. An acute atrophy of recent duration with incipient cirrhosis is almost invariably a very bad surgical risk and operation does harm; such little chance as the patient has lies in letting him alone. I can see no lead as to how one is going to recognize cases of this sort at the present time.

Have you any further comment, Dr. Smith?

Dr. Smith: No; I think that is what one might expect, that the diagnosis seemed altogether too easy. It is a little hard for me to see why the patient was not sicker. If he had that amount of acute yellow atrophy and liver necrosis I should certainly expect him to be sicker.

Dr. Jones: I agree with what Dr. Mallory said about operation very rapidly tipping the scales in the wrong direction.

Dr. Smith: He had been jaundiced a month.

Dr. Jones: That is not uncommon. I am sure there are cases of subacute yellow atrophy that will go a month with very few symptoms, no vomiting, and then very suddenly go bad. I do not know what the criterion is to make one say that this patient is going bad tomorrow or a few days later.

Dr. Means: Dr. Mallory, do you feel that the jaundice was due to intrahepatic obstruction?

Dr. Mallory: Yes, I do.

Dr. Means: Why did he have a big gall bladder, and what rôle did the mass in the pancreas play?

Dr. Mallory: There was nothing in the head of the pancreas but inflammatory thickening and a very slight thickening in the mucosa of the bile duct.

Dr. Means: I thought the surgeon described a mass.

Dr. Mallory: I was unable to convince myself of one. In regard to the second question, the reappearance of bile in the stools is evidence that the patient did not have complete suppression of bile. Some was getting through and would probably reach the gall bladder. The latter may not have been functioning normally and may have allowed it to accumulate.

Dr. Means: What kind of bile did he have?

Dr. Mallory: It was colored. There is no further note as to that.

A Physician: What displaced the stomach?

Dr. Mallory: I think the small liver.

I think that one thing that might give a key to some of these cases would be an accurate clinical measure of the size of the liver. It seems to me that as many mistakes in diagnosis occur from inability to estimate the size of the liver as from any other point that comes up in physical diagnosis. Again and again the liver is considered enlarged clinically and at autopsy it is found to be small but peculiar in shape or unusually low in position.

A Physician: How large was the spleen?

Dr. Mallory: It was normal in size.

Dr. Bernard M. Jacobson: Do you think direct laparoscopy would be indicated in a case like this? Do you think the liver was small enough to be noted with direct visualization of the cavity with an instrument?

Dr. Mallory: I do not think you get much of an estimate as to the size of the liver with one of those machines. You could see the nodules on the surface and recognize atrophy or cirrhosis, but I am not sure that you could differentiate the two.

Dr. Jones: Certainly the one physical finding that was absent in this case was the fact that with a month's jaundice, practically complete most of the time, he did not have a big liver. Usually one would expect it. The other point that is important is the condition of jaundice and pain simulating biliary colic and gall bladder disease. I do not know how you are going to say it is not due to gallstones, but it has to be borne in mind that it does go with biliary colic or carcinoma of the pancreas.

A Physician: How much is the liver enlarged ordinarily in complete obstruction of the common duct?

Dr. Mallory: It is apt to be increased fifty per cent, sometimes one hundred per cent in size.

Simple bile stasis will bring it down half way to the umbilicus.

CASE 20112

Presentation of Case

A twenty-two year old American housewife entered with the complaint of abdominal pain of twenty-four hours' duration.

The morning before admission the patient awoke feeling somewhat weak, but with no other

symptoms. About ten minutes after her noonday meal she had sudden severe midepigastric pain which radiated downward, chiefly to the left lower quadrant but also to the right lower quadrant. The pain was followed by vomiting. She vomited more than ten times during the remainder of that afternoon. During the night the pain was very severe and the vomiting continued. She had chilly sensations and had to apply blankets and hot water bottles to keep warm. She had no urinary symptoms other than frequency five or six times that afternoon and five times that night. There was no burning. There were no tarry or bloody stools. There was no jaundice. She had two normal bowel movements the day before admission and one the morning of admission. She had been examined two months before entry, told she had high blood pressure and put on a diet.

She had been married for a year and a half but had never had sexual intercourse because of congenital atresia of the vagina.

Physical examination showed a well developed, obese young woman. Her lips were white. There was cold sweat and goose flesh all over her skin. Her abdomen was distended and tympanitic. The liver dullness was obliterated. There was no board-like rigidity anywhere, but there was mild rigidity of the recti. There was diffuse tenderness to palpation and generalized spasm all over the abdomen, most marked in the right lower quadrant. There was no flank dullness or fluid wave. Rectal examination revealed moderate tenderness high up in the vaults. On anterior palpation a somewhat tender lemon-sized mass was felt in the midline. This was believed to be a retroverted uterus.

The temperature was 101°, the pulse 110. The respirations were 30. The blood pressure was 95/80.

Examination of the urine showed a large trace of albumin and twelve red blood cells per field. The sediment was loaded with white blood cells. The blood showed a red cell count of 4,300,000, a hemoglobin of 70 per cent, a white cell count of 17,500 and 90 per cent polymorphonuclears.

X-ray examination showed a high diaphragm. The lung fields were clear. The heart shadow was not remarkable. There was no visible air below the diaphragm except in the stomach and bowel. There was a rather large collection of gas in the colon and what appeared to be the cecum in the right upper quadrant.

Operation was performed immediately after admission. Following this she was given a transfusion. A few days after operation the temperature rose to 106°, the pulse to 145, the respirations to 35. Her urine became loaded with albumin and was dark in color. She developed pitting edema of the ankles and face. The output of her urine diminished in amount. On the seventh day a note was made that she put out only five cubic centimeters of urine in twenty-four hours. The non-protein nitrogen at the time was 61 milligrams. The following day her non-protein nitrogen was 76 milligrams, the chlorides 618, the carbon dioxide combining power 46.2 volumes per cent, and the serum protein 5 per cent. She continued to be almost completely anuric. The edema increased and she became irrational. A hematoma appeared on the right buttock extending down towards the perineum. On the thirteenth day her non-protein nitrogen was 185 and the serum protein 4.2 per cent. She died on the following day.

Differential Diagnosis

Dr. Fuller Albright: I agree with the people who saw her in the Emergency Ward that she had an acute abdomen, and I am assuming that they did find something in it.

Dr. William H. Snyder Jr.: She had a gangrenous appendix. The operation was an appendectomy with drainage.

Dr. Albright: That rules out any suggestion that she might have had acute pyelitis. It is rather unusual for a patient to come in twenty-four hours after the onset of symptoms with red cells, white cells and albumin in her urine unless she has pyelitis.

The question that seems most interesting to me is what happened to cause her death. Before taking that up I want to go back to a few things in her past history that are probably of no importance but perhaps require a little discussion.

In the first place one wonders whether there may not have been multiple congenital abnormalities. The congenital atresia of her vagina is perhaps of some interest; one would like to know if she had normal periods. One gets the suggestion that she had a normal-sized uterus. Whether she was having any backing up of menstrual flow leading to endometriosis or chocolate cysts, passes through my mind.

Also we find that she did have hypertension in the past. This brings up the remote possibility of another congenital abnormality, coarctation of the aorta. I will return to that later.

It seems to me the next question is whether she did or did not have chronic nephritis. I think she did not, in spite of the one note about her having been told that she had hypertension. Against chronic nephritis are the following three facts: (1) She had a normal red cell count and hemoglobin. It would be helpful to know the specific gravity of the urine, but we are not told that. (2) The heart was normal by x-ray and physical examination, a fact which in any case is surprising because of the constant hypertension. (3) The fundi were presumably normal, as we are not told that they were abnormal.

The next question is, was this terminal event a uremia associated with dehydration from vomiting and a secondary kidney shut-down or some

acute kidney condition? I believe some acute kidney condition. If vomiting had caused this, her chlorides should have been low instead of normal, because of loss of chlorides in the vomitus; her serum protein should have been high instead of low because of dehydration; edema should not have been present; her urine sediment should not have been so abnormal.

Therefore it comes down to the fact that she had some acute kidney episode. The question is what. The three possibilities which occur to me are septicemia with embolic phenomena in her kidney, acute hemorrhagic nephritis, and thrombosis of the renal arteries. The duration is against the first. The kidney damage could not get so far in so short a time. Also the emboli would almost have to come from endocarditis, and I think that is unlikely.

The next possibility is acute hemorrhagic nephritis due to a septic focus with kidney shutdown in the acute stage, and that seems to me to be the best solution to the problem. I think we do not very often see patients die so quickly from acute nephritis, but I think that is the best probability.

The other possibility that occurred to me was acute infarct of both kidneys. There is the bare possibility that she had a coarctation, and that with the lowering of her blood pressure while she was in shock there was a thrombosis of the renal arteries, perhaps secondary to a thrombosis in the aorta. The possibility went through my mind that the acute abdominal condition might likewise have been a mesenteric thrombosis.

My guess, however, is that she had acute sepsis with acute hemorrhagic glomerular nephritis and complete kidney shut-down. There is just the possibility that there may have been thrombosis of the renal arteries. I do not know.

DR. TRACY B. MALLORY: Have you anything to add, Dr. Faxon?

DR. HENRY H. FAXON: I can perhaps add a little to the story of the course which she ran. The house officers and several other men saw her, ten of us in all, and only two of us agreed as to the primary cause of her acute abdomen. She obviously presented a picture which is extremely rarely associated with an appendix. We felt that in her condition she ought not to be given general anesthesia if we could avoid it, and we did not want to give her spinal anesthesia because of her low blood pressure. I opened the abdomen under local anesthesia and satisfied myself that she had appendicitis without a very widespread peritonitis. The process was fairly well localized and walled off from the rest of the abdominal cavity. She was an obese girl, and to expedite matters and minimize trauma the local infiltration of novocain was supplemented by a short period of inhalation anesthesia while the appendix was being freed up and removed.

Following operation she showed a marked elevation in temperature and was very sick, but on Ochsner régime she promptly proceeded to do very well. It has not been brought out that her temperature, pulse and respiration came down very satisfactorily during the period of the first week, and for a time it looked as if the case were going to have a favorable outcome. It was not until later that she showed the striking kidney signs that proved fatal in the end. So far as the abdomen went, it showed satisfactory progress. She drained a moderate amount and had no striking abdominal signs to blame, it seems to me, as a contributing factor in the fatal outcome.

DR. MALLORY: Is there anything there to change your opinion, Dr. Albright?

DR. ALBRIGHT: No; I perhaps did not emphasize that there was sepsis elsewhere.

DR. FAXON: As I remember it, the temperature not only came down but ran several days as essentially normal. Is that right, Dr. Snyder?

DR. SNYDER: It was very nearly normal.

DR. GEORGE W. HOLMES: Here is the chest film. I think we can all see that the heart is normal in size and shape. The question of coarctation has been raised. The only evidence of any particular value that we get by x-ray is a change in the lower borders of the ribs, and this is not always present. It is not in this case. Many of those cases, however, do show erosion of the lower borders of the ribs. If we have an opportunity of studying the case more carefully and films are taken in the oblique view, we can sometimes show the coarctation.

As to the question of free air in the abdomen, I think it would have been visible in this film. We should have seen the gas directly below the diaphragm. This film was probably taken in the upright position. It is important in taking these films with that point in mind to have the patient sitting up or on his side, so that the gas bubble will be visible.

The question has also been raised as to whether or not we are able to demonstrate the cecum without giving barium. I think we can. In this film there is a distinct shadow of the cecum, and then we can follow the course of the large bowel across the abdomen. Sometimes it is possible to outline the large bowel about as well by air as by barium. The cecum is apt to be high in cases with abscess in that region. In this case the cecum is hidden, so that while we certainly cannot make a definite diagnosis of abscess we might suspect it with such an appearance.

This film was taken with the patient lying on her side; the rays were passing through from

front to back and no free air was demonstrated in the abdominal cavity. Occasionally with extensive adhesions in the abdomen the gas bubble is not formed.

This last film is a portable film taken four days after the first examination. The change in the size of the heart as compared with the first film is probably due to the way the film was taken and not to any marked increase in the size. I do not see any definite evidence of disease in the lung at that time.

DR. EDWARD L. YOUNG, JR.: Could you be sure of two kidneys in the second x-ray? The point being that in a person who shows some evidence of congenital abnormality we have to consider either a complete absence of one kidney or a hypoplasia.

DR. HOLMES: There is a shadow here on the right that might be a kidney. I do not see anything on the left. Usually we can see the left kidney better than the right. With an abdomen as distended as this, one would not be justified in drawing any conclusion at all.

CLINICAL DIAGNOSES

Acute gangrenous appendix with local peritonitis.
Essential hypertension.
Vascular nephritis.
Anuria.

ANATOMIC DIAGNOSES

Acute nephrosis.
Operative wound, appendectomy.
Localized peritonitis.
Chronic fibrous pleuritis.
Partial atresia of the vagina.

PATHOLOGIC DISCUSSION

DR. MALLORY: The autopsy findings here were quite peculiar. There was a small localized abscess in the appendix region well walled off by ileum. It had not spread to the general abdominal cavity. It did not seem large enough to be a very important factor in her death. Moreover it appeared to cause no intestinal obstruction.

The most interesting finding is the kidney. There were two of them and they weighed together nearly 550 grams, in other words twice the normal size. The capsules stripped very readily and left a somewhat pale surface. We thought that it probably was an acute glomerular nephritis, as Dr. Albright predicted, but when we came to examine it microscopically the glomeruli were completely negative and there was a very severe grade of tubular damage. It is an acute tubular nephritis which would pass perfectly well for a bichloride kidney. Cooke* has recently described a similar type of nephritis in the alkalosis that follows pyloric stenosis with marked vomiting. The other condition in which a practically similar appearance is frequently seen is pregnancy; but an acute tubular lesion leading to a uremic death except in these three conditions is extremely rare. It is occasionally seen in diphtheria and a few of the exanthemata. I have never before seen it in sepsis, as it was here. The possibility of mercury was not thought of at the time of operation and no test was made for it, but I think it is quite improbable. Usually the entire gastrointestinal tract shows a marked inflammatory reaction, and that was not present here.

I will show you the sections. I think even at this power you can see long linear bluish masses, which are casts in the tubules. The tubular cells show a fairly extensive grade of degeneration and the glomeruli even with special stains are I should say absolutely negative.

DR. CHESTER M. JONES: I had forgotten that I had seen her, but I wrote a note saying it was probably essential hypertension with renal damage and gastric tetany, because she did have the signs of tetany when I saw her.

DR. MALLORY: The clinical picture comes very close to the picture seen in pregnancy, but the vagina, as was described, was very small, not wholly atretic, but certainly functionless. The uterus was infantile in type. The ovaries appeared to be normal.

DR. AUBREY O. HAMPTON: We have had one or two cases of almost complete obstruction of both ureters by appendiceal abscess. I wonder if there is any indication at all of that condition existing here.

DR. MALLORY: There is no suggestion of it here.

DR. ALBRIGHT: Knowing the autopsy, it seems to me that acute mercurial poisoning best explains all the facts. This causes colitis,—why not inflammation of that appendage to the colon, the appendix? Otherwise we are left in a quandary as to why this patient should have developed acute appendicitis and acute nephritis at the same time. I wish I had thought of this. I could have worked up a good case with the vaginal atresia as the cause of the suicide.

*Cooke, A. M., Quart. J. of Med. 2:538, 1933.

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A HEALTH CRISIS IN BOSTON

THE Health Department of the City of Boston faces a serious situation because of urgent demands for curtailment of its budget. Unwise recommendations of the Finance Commission*, not concurred in by its Chairman, have proposed emasculation of the Health Units and, very recently, at least equally unwise counsels have proposed that the supervising nurses of the Nursing Division be reduced to the position of Staff Nurses and that an equal number of Staff Nurses be discharged.

We are amazed that such proposals should be made in the name of economy. It is as if one should say: "This tree is too large. Let us, therefore, cut off the fruit!" Would it not be better to improve the tree by wise pruning and by the removal of dead wood? Is it not possible that the Health Department, which for years has been growing in importance and in value to the public, might benefit now by a drastic reorganization which would conserve its vitality, increase its usefulness and at the same time make radical curtailments in the cost of operation?

The issue is sharply drawn. Responsibility for wise budgetry curtailment rests finally with the Mayor but, in this matter of health, he should have competent advice and be governed by it.

The Health Commissioner at this juncture is in a position to make a strong plea for continuance of the essential functions of the Health Units, against the threat to his Nursing Division, and to point the way to wise reduction of health expenditure.

The Mayor also has the opportunity, by wise curtailment in the Health Department, to perform a signal service to Boston which will be appreciated by all citizens who understand the value of good health service.

Under those circumstances would not the Health Commissioner do well to propose, and the Mayor to institute, a study of the problem by some well-recognized individual or group from elsewhere whose recommendations will be entirely free from local prejudice or personal considerations? We believe that such an investigation should be undertaken at once in the interest, particularly, of the poor of Boston, and above all for the benefit of their children whose life or death may depend on the quality of health service.

*Report of the Finance Commission of Boston to the Legislature. December 31, 1933.

AN ATTACK ON THE VACCINATION LAW

ON March 6, 1934 a concerted attack on the present law of this Commonwealth requiring the vaccination of public school pupils was made before the Committee on Public Health of the Legislature.

The hearing was on House Bill 896, which seeks to amend the present law relating to vaccination. William Shaw MacCullum was the attorney for the petitioners, and he based his argument on his avowed belief that the present law is unconstitutional in that it provides for the invasion of one's body over the objection of the individual. In his denunciation of the law and the practice of vaccination, this attorney worked himself up to an ecstasy of dramatic expostulation of his objection to the law and the underlying purpose of it.

In fairness to the legal profession we assume that his attitude was based on his expectation of winning the approval of his employing committee rather than on his lack of knowledge of the importance of vaccination.

If he is really unacquainted with the evidence in favor of the almost perfect elimination of smallpox through vaccination and the almost infinitesimal danger of this simple procedure, one might question the amount of study which he has devoted to this subject. His behavior

did not impress many in the audience with his forensic ability.

Many of the arguments presented at this hearing were repetitions of the prejudices and fears which have been in evidence on previous occasions, one of which, relating to the dissemination of syphilis by cowpox vaccine, was stressed. A significant feature of the campaign conducted by the anti-vaccinationists, that of letters to members of the Legislature implying antagonistic activities in the future elections, was brought out by the committee.

As on many previous occasions, this effort to break down the present vaccination law requires prompt action by the medical profession in showing to the Legislature the almost unanimous feeling among public health authorities and physicians respecting the importance of preventing smallpox. Dr. Robey, President of the Massachusetts Medical Society, Dr. Rosenau, Professor of Preventive Medicine and Hygiene, Dr. Chadwick, Massachusetts Commissioner of Public Health, and Dr. T. J. O'Brien, Executive Assistant to Dr. Robey, presented the important arguments in favor of vaccination, and showed the fallacies of the antis.

Unless the work of these representative men is followed up by practitioners, there is danger of Massachusetts losing the standing which has been acquired through the laws now in force.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

GARLAND, JOSEPH. A.B., M.D. Harvard University Medical School 1919. Physician to Children's Medical Service, Massachusetts General Hospital. Consulting Pediatrician, Massachusetts Eye and Ear Infirmary. Instructor in Pediatries, Harvard Medical School. Consulting Pediatrician to New England Baptist Hospital and Addison Gilbert Hospital, Gloucester. His subject is "Dental Health: A Problem in Nutrition." Page 563. Address: 264 Beacon Street, Boston, Massachusetts.

CLIFFORD, STEWART H. M.D. Harvard University Medical School 1925. Instructor in Pediatrics and Child Hygiene, Harvard Medical School. Visiting Pediatrist, Boston Lying-In Hospital. Assistant Physician to the Children's Hospital, Boston, Massachusetts. His subject is "A Consideration of the Obstetrical Management of Premature Labor." Page 570. Address: 270 Commonwealth Avenue, Boston, Massachusetts.

HIMES, NORMAN E. B.S., M.A., Ph.D. Formerly, Fellow Social Science Research Council; Assistant Editor, Sociology Section, Social Science Abstracts. At present, Assistant Professor of Sociology, Colgate University, Hamilton, New York. His subject is "The Medical History of Contraception." Page 576. Address: Colgate University, Hamilton, N. Y.

RONKA, ENSIO K. F. M.D. Boston University School of Medicine 1927. Assistant Visiting Surgeon, Massachusetts Memorial Hospitals. Courtesy Staff, Quincy City Hospital and Milton Hospital. Assistant in Anatomy and Surgery, Boston University School of Medicine. His subject is "Infestation with Diphyllobothrium Latum. Fish Tapeworm." Page 582. Address: 15 Bay State Rd., Boston, Massachusetts.

HAGGARD, HOWARD W. M.D. Yale University School of Medicine 1917. His subject is "The Function of the General Practitioner in Public Health Work." Page 584. Address: Yale University, New Haven, Connecticut.

AUSTIN, A. E. A.B., A.M., M.D. Harvard University Medical School 1887. Physician Emeritus, Boston Dispensary, Professor Emeritus, Tufts College Medical School. His subject is "Progress of Gastroenterology in 1933." Page 588. Address: 270 Commonwealth Avenue, Boston, Massachusetts.

MISCELLANY

COURT DECISION RELATING TO PUBLIC HEALTH*

City ordinance, making vaccination a prerequisite to admission to a public school, upheld.—(Mississippi Supreme Court; *Hartman* v. *May, et al.*) An ordinance of the city of Biloxi made it unlawful for any child of educable age to attend any school in the city to which the public generally was admitted unless the child, previous to the date of his or her application for admission, had presented to the superintendent, principal, or teacher in charge of such school a certificate from the city health officer or some other reputable physician of the city showing that the child had been successfully vaccinated against smallpox or was immune to the danger of contracting the disease. A resolution on the subject, adopted by the board of trustees of the city schools, was in accord with the requirements of the ordinance. The governing authorities of municipalities were empowered by section 2396 of the Code of 1930 "to make regulations to secure the general health of the municipality" and by section 2417 "to make regulations to prevent the introduction and spread of contagious or infectious diseases" and "to make quarantine laws for that purpose."

An injunction was sought to restrain the defendants, the superintendent and board of trustees of the city schools, from refusing to permit the appellant, an 8-year old child, to enter school. The bill of complaint alleged that the child was excluded from school

*This abstract was prepared from a mimeographed copy of the decision furnished to the Public Health Service by the Mississippi State Board of Health.

because he had not been vaccinated, that there was no epidemic of smallpox in the city, that the said child had not been exposed to smallpox or other communicable disease, and that he had violated none of the valid school rules. A demurrer to the bill of complaint was sustained by the lower court, and an appeal was taken to the supreme court.

On appeal it was contended that, in the absence of an express statutory requirement of vaccination against smallpox as a prerequisite to a child's right to enter the public schools, a municipality had no power to require vaccination as a condition precedent to the right to attend its schools, or, in other words, that the general statutory grant of authority to municipalities to make regulations to prevent the introduction and spread of contagious or infectious diseases did not empower municipal authorities to exclude children from the public schools because of failure or refusal to be vaccinated. The further contention was made that, in the absence of an epidemic of smallpox in the city, the vaccination ordinance was arbitrary and unreasonable and, therefore, void. After detailing the statutory provisions quoted above, the supreme court went on to say:

* * * The medical profession generally recognize vaccination as an effective means of prevention of the disease (smallpox), and we do not think that the ordinance, requiring children to be vaccinated as a condition to their admission to a public school, is an arbitrary and unreasonable exercise of the power "to make regulations to prevent the introduction and spread of contagious or infectious diseases." The power granted is not only to make regulations to prevent the "spread" of such diseases but to prevent the "introduction" thereof. The argument of counsel that the unreasonableness and invalidity of the ordinance is emphasized by the fact that there was no case of smallpox in the municipality or surrounding territory and no threatened outbreak of the disease is not supported by the averments of the bill of complaint. The bill merely charged that there was at the time no epidemic of smallpox in the said city.

In the exercise of the power and authority granted to make regulations to secure the general health and prevent the introduction and spread of contagious or infectious diseases much must be left to the judgment and discretion of the municipal authorities, and the presumption is in favor of the reasonableness and propriety of regulations enacted in pursuance of such grant of power. The ordinance here in question was intended and reasonably calculated to prevent the introduction or spread of contagion and bears a direct and intimate relation to the maintenance of the health of the inhabitants of the municipality, and we are unable to say that, in the enactment thereof, there was an unreasonable or arbitrary exercise of power. * * *

While there is authority in other jurisdictions for the view that a general legislative delegation of power to make regulations for the preservation of the public health does not confer on municipal or school authorities the power to require children to be vaccinated as a condition to their admission to a public school, there is also ample authority supporting the views herein expressed. * * *

The appellant also contended that, in view of a constitutional provision requiring the legislature to establish "a uniform system of free public schools by taxation or otherwise for all children between the ages of 5 and 21 years" and of a statutory provision making school attendance compulsory, the municipal and school authorities of the city had no power to refuse him admission to school because of his refusal or failure to submit to vaccination. Concerning this the court said:

* * * The same contention and argument was presented in the case of *McLeod* v. *State, supra,* and while the validity of health regulations was not there presented, the principle involved was the same, and the language of the court in disposing of the point is applicable and controlling here. In that case it was held that "Section 201 of the constitution does not deprive the legislature of the power to pass laws authorizing trustees of public schools to make reasonable rules and regulations for the government and conduct of such schools." In passing upon the apparent conflict between regulations excluding certain classes of minors from the public schools and the compulsory education provisions of the school code, the court there held that the compulsory education provision of the school code and other provisions of the code authorizing reasonable regulations for the management, conduct, and control of schools should be construed together, the court saying: "So construed, they do not mean that a child is entitled to attend a public school regardless of his conduct, but on the contrary that it is subject to such reasonable rules for the government of the school as the trustees thereof may see fit to adopt."

The court concluded its opinion as follows:

* * * It having been determined in the case at bar that the ordinance requiring vaccination as a condition to admission to the public schools was a reasonable and valid exercise of the power granted to the municipality to make regulations to prevent the introduction and spread of contagious or infectious diseases, it follows that the appellant was not entitled to admission to the schools in violation of the provisions of the ordinance.

CLINICAL MEDICINE AND SURGERY CHANGES HANDS

Forty years ago, *Clinical Medicine and Surgery* was founded by the Abbott Laboratories, under the name of *The Alkaloidal Clinic*, and, with various changes of name and editorship, has been owned by them ever since.

For the past ten years, under the editorship of Dr. George B. Lake, its editorial policy has been entirely independent; but now, with the passing of its sole ownership to Dr. Lake, it becomes fully independent, in form and in fact as well as in policy.

Assurance is given that there will be no recession from the editorial and advertising standards which have been maintained for many years, and no immediate change in its name or format, but it is felt that the new set-up will allow an even greater freedom for coöperation and helpfulness, for readers and advertisers, than ever before.

The new editorial and business offices of "C. M. and S." will be in the Medical and Dental Arts Building, Waukegan, Ill., with a Chicago office at Room 670, 410 North Michigan Avenue.

A LOW RECORD FOR DIPHTHERIA

Dr. Henry D. Chadwick, Massachusetts Commissioner of Public Health, has reported that during February 1934, diphtheria was less prevalent than at any time since records of this disease have been compiled. The figures are 27 cases in Massachusetts in February this year, as compared with 242 cases, the average February number for the previous five years.

This condition is a tribute to the State Health Department for efforts are constantly being made to secure the coöperation of local boards of health and physicians throughout the State. The education of the people is bringing more of the laity to accept the advice of doctors to have children immunized.

THE APPOINTMENT OF DR. F. C. IRVING

Dr. Frederick Carpenter Irving, Professor of Obstetrics at the Harvard Medical School since 1931, has been elected to the chair of the William Lambert Richardson Professor of Obstetrics, as endowed in the will of Dr. Richardson.

Dr. Irving graduated in medicine from the Harvard Medical School in 1906, and is Chief of Staff of the Boston Lying-In Hospital.

A RADIO MESSAGE PREPARED AND SPONSORED BY THE COMMITTEE ON PUBLIC EDUCATION OF THE MASSACHUSETTS MEDICAL SOCIETY FOR THE DEPARTMENT OF PUBLIC HEALTH

The Cause and Treatment of Crossed Eyes*

BY PAUL A. CHANDLER, M.D.

The terms crossed eyes, strabismus or squint, refer to that condition in which one of the eyes is out of line with its fellow. It may be turned in or out or up or down. It is not at all an uncommon condition, probably occurring about once in every fifty to sixty children who consult an eye physician.

In at least fifty per cent of the cases there is a history of crossed eyes somewhere in the family, and not infrequently more than one child in a family is affected. I shall try to point out the more important causes, discuss various forms of treatment, and the results to be expected from such treatment.

*Broadcast December 1, 1933. Station WBZ.

The most important cause is lack of binocular vision, or ability to use the two eyes simultaneously. Most people have some minor muscle imbalance in their eyes, usually a latent tendency for the eyes to turn in or out. This tendency never causes difficulty, because with both eyes open the muscle difficulty is overcome, and the eyes are held parallel so that both eyes can be used together. If one of the eyes should turn out of line with the other, the result would be to see double. We therefore have a strong natural stimulus to overcome any minor muscle difficulty we may have in order to avoid double vision. Now, in most cases of crossed eyes there is no binocular vision. One eye only is used at a time, and thus double images are not seen, no matter how much one eye may turn. In these cases there is lacking, therefore, the strong stimulus to overcome the latent muscle weakness and avoid double vision. The eye may turn very markedly, but cause the patient no inconvenience whatever. If then, there is no binocular vision, a muscle imbalance will usually cause one of the eyes to turn.

A second cause is a marked difference in the refraction of the eyes, as when one is farsighted and the other nearsighted. Here it is difficult under any conditions to use the two eyes together. The better eye will be used alone, and if there is a latent tendency toward a deviation, the poorer eye is apt to turn.

A third cause is a high degree of farsightedness. This creates a strong tendency toward convergence, and, if binocular vision is poor, a convergent squint is usually the result. These last two conditions do not always lead to crossed eyes, but often do, especially where there is a poor muscle balance to begin with.

Parents frequently attribute crossed eyes to childhood illness or accident. True, the first sign of trouble is often noted after an illness or accident. The lowered general vitality may be just enough to bring out such a latent trouble, but these things will never cause the condition unless the underlying causes are present. One should not then properly say, for instance, that measles caused an eye to turn, but rather that measles unmasked a latent trouble.

Before leaving the causes of squint, let me say a few words about an entirely different type of squint from that which I have been discussing. I refer to so-called paralytic squint, or squint due to a definite paralysis of one of the eye muscles. This occurs in a number of diseases affecting the nerve supply of the muscles. In most of these cases the crossed eye should be regarded as a symptom of some general disease, and usually rights itself when recovery from the disease takes place.

What is to be done about the condition once it is recognized? Well-meaning friends will often advise parents to do nothing, saying that the child will probably outgrow it. This is very poor advice for the following reason: where it is always

the same eye that turns this eye is never used, and almost invariably there is a serious loss of vision from disuse. Just how or why this comes about we do not know, but the fact remains that vision in a turning eye is often reduced to counting fingers a few feet away. If steps are taken early to force the use of the turning eye, this loss of vision can often be prevented. If it has already taken place it can often be partially or completely restored. The younger the child, the better the chances of restoring the vision. In infancy, vision can usually be improved very quickly. As the child becomes older this becomes more and more difficult. After the age of five or six there is not much hope of restoring vision that has been lost from disuse.

What parents should do, therefore, when a squint is first noticed is to consult a reputable eye physician. After a thorough examination of the eyes he will be able to evaluate the case and decide on the proper treatment. Treatment in general may be described as medical or surgical. Medical treatment consists in prescribing glasses and in various forms of exercises. Although the wearing of proper glasses alone will sometimes straighten crossed eyes, this is by no means true of all cases. Probably not more than one-fourth of all cases are benefited by glasses, and in a good many cases glasses are never prescribed. There are a number of exercises which are tried in suitable cases, but here again, in a good many instances, probably in most, exercises are worthless. The great difficulty with all of the exercises is that they must be done at an age when the child is seldom far enough advanced to do them properly. In general one can probably fairly say that few cases of crossed eyes are cured by the use of exercises.

In every case where it is always the same eye that turns, steps should be taken to force the use of the turning eye. This is accomplished by bandaging the good eye, or using drops in it to blur the vision, and so oblige the child to use the poorer eye.

There are many cases not helped by any of these measures, and one must resort to surgical treatment. In regard to surgical treatment, the eye physician is often asked the following questions: Can crossed eyes always be straightened by operation? The answer is: they almost invariably can. Is more than one operation necessary? It may be. If the eyes are not straight after one operation, a second may be done, or even a third, if necessary. Will straightening the eyes by operation improve the vision? It will not; operation is purely for cosmetic purposes. Is there any risk to this sort of operation? One can answer this question by saying that of course there is some element of risk to any surgical procedure. In this case, however, the risk is so negligible that the eye physician unhesitatingly advises operation where it is indicated. What is the best time to operate? Whenever one is sure that medical treatment is ineffective. As a rule not before the age of five. Can eyes be straightened after one has reached adult life? Yes, operation is just as feasible at age 50 as at age 5. Why operate at all if only for cosmetic purposes? Because crossed eyes may well constitute a serious handicap in the effect they may have on the emotional life of the child. Many children with this deformity become so shy and hypersensitive as to have their whole lives affected. They are the constant butt of their playfellows, and retire more and more into themselves to escape the ridicule of other children. Do not let your child grow up with this handicap.

To summarize, then, the principal causes of crossed eyes are as follows:

1. Lack of binocular vision plus a muscle imbalance.

2. Marked difference between the two eyes plus a muscle imbalance.

3. A high degree of farsightedness plus poor binocular vision. It is important to consult a physician early to avoid serious loss of vision in the turning eye. Treatment consists in wearing glasses, in exercises, or in operation. Operation should be done in all cases where other forms of treatment are unsuccessful. I repeat: no child should be allowed to grow up handicapped by the deformity of crossed eyes, nor should an adult with a squint think it too late to rectify such an unfortunate condition.

OBSTETRIC JABBERWOCKY

'Twas onset, and trimester third
  The puerperium did bring;
All-round asepsis was the word,
  And pelvic measuring.

Beware maternal death rates, son,
  The figures statisticians hatch;
Beware Caesareans, and shun
  Pituitrin's despatch.

He took his brushes in his hand,
    Long time he scrubbed him, elbow high;
Then rested he by the parous she,
  And wondered what to try.

And as in spotless gown he stood,
  With fresh obstetric lore aflame,
The thoughts of forceps seemed so good,
  He promptly tried the same.

One two! One two! And twins came through!
  The sterile shears went snicker-snack!
He leaped the bed and felt each head,
  And patted each plump back.

And hast thou thy delivery done?
  Come, here's a job that's harder still:
Thy task is now to figure how
  Thou canst collect thy bill!

'Twas onset, and trimester third
  The puerperium did bring;
All-round asepsis was the word,
  And pelvic measuring.

I. K. Reed.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1933 AND SEVEN YEAR AVERAGE

MONTH ENDING MARCH 3, 1934

Diseases	1934 Week ending Feb. 10	1934 Week ending Feb. 17	1934 Week ending Feb. 24	1934 Week ending Mar. 3	Average cases reported for week corresponding to Mar. 3 for past seven years	1933 Week ending Feb. 11	1933 Week ending Feb. 18	1933 Week ending Feb. 25	1933 Week ending Mar. 4
Cerebrospinal Men.	—	—	—	—	2	2	—	1	1
Chicken Pox	130	116	72	90	105	100	96	94	105
Diphtheria	8	3	2	3	16	3	3	6	1
Dysentery Amebic	—	—	1	—	—	—	—	—	—
Dysentery Bacillary	—	—	—	—	—	1	4	4	—
Encephalitis Epid.	—	—	—	—	—	1	—	—	—
German Measles	—	1	5	1	35	1	2	4	5
Influenza	18	3	6	24	36	87	38	24	24
Measles	33	39	30	49	276	148	159	189	178
Mumps	126	162	54	122	92	72	45	72	101
Pneumonia (Broncho)	36	31	31	29	47	49	32	38	48
Pneumonia (Lobar)	63	37	46	39	56	63	38	43	37
Scarlet Fever	58	50	44	53	90	98	97	137	109
Septic Sore Throat	1	—	—	—	4	3	—	—	—
Smallpox	—	—	—	—	1	2	1	—	2
Tetanus	—	—	—	—	—	1	—	—	—
Trachoma	—	—	—	1	—	—	1	—	—
Trichinosis	—	1	—	2	—	2	—	1	1
Tuberculosis (Pul.)	20	24	11	41	26	18	26	13	29
Tuberculosis (O. F.)	—	—	4	4	3	2	1	—	1
Typhoid Fever	2	—	—	1	—	2	—	—	—
Undulant Fever	—	—	2	—	—	—	1	—	1
Whooping Cough	40	58	27	37	75	78	82	36	118
Gonorrhea	14	47	9	30	34	37	40	66	51
Syphilis	45	31	32	47	49	69	21	54	54

Remarks: No cases of Asiatic cholera, glanders, plague, or yellow fever during the past seven years.

CORRESPONDENCE

THE COMMON COLD AND INFLUENZA

City of New York
Department of Health
139 Centre Street
Borough of Manhattan

March 3, 1934.

Managing Editor, *New England Journal of Medicine,*

I should like to comment on that part of your recent editorial on The Common Cold which deals with influenza.

In New York City, cases of influenza have been reported to the Department of Health since 1918. Printed tables giving the reported cases week by week during this period are available. A study of these tables indicates that from time to time sharp rises occur in the number of reported cases. Almost always the rise is abrupt, the peak being reached in from two to three weeks; the decline is equally sharp so that the entire flare-up occupies only from five to six weeks. When a sharp, sudden increase in the reported cases occurs, and when the course of the outbreak has the characteristics just described, I do not hesitate to say that we have been dealing with a specific infection, one which we call "influenza," and which is not an intensified form of the common cold. Other features of these sharp outbreaks also deserve consideration. Apparently, there is never more than one outbreak a year, and there are years when no typical outbreak occurs. The sharp outbreaks usually cause a marked increase in the general death rate, exacting a considerable toll of lives among those who have heart disease and among the aged. In seasonal occurrence these outbreaks do not agree with the seasonal incidence of influenza-bacillus meningitis. Bacteriological examinations of fresh cases observed during

the course of these sharp outbreaks, i.e., cases reported as clinically "influenza" usually fail to implicate the Pfeiffer bacillus as a factor.

Altogether the evidence is strong that during these sharp outbreaks we are dealing with a specific infectious disease, and not with a severe type of the common cold. To apply the term "influenza" only to infections caused by Pfeiffer's bacillus is illogical. Instead we ought to discard the designation "influenza bacillus" for the germ originally described by Pfeiffer.

In New York City, between the sharp outbreaks smaller numbers of cases are reported week by week throughout the year. In the absence of a specific diagnostic criterion, it is impossible to say whether these are really cases of the same infection which occurs during the five or six weeks of the outbreak. For the reasons presented above I believe we are in a position to make a correct diagnosis of the *outbreak*, after it has passed.

Very truly,

CHARLES BOLDUAN, M.D.,
Director of Health Education.

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago, Ill.,
March 3, 1934.

Managing Editor,
The *New England Journal of Medicine,*

In addition to the articles enumerated in our letter of January 30 the following have been accepted:

Hoffmann-La Roche, Inc.
Tablets Digalen—Roche, 1 Cat Unit

National Drug Co.
Scarlet Fever Streptococcus Toxin for the Dick Test (National) fifty test package
Typhoid-Paratyphoid A Vaccine, thirty 1 cc. ampule-vials package

Parke, Davis & Co.
Ortal Sodium
Capsules Ortal Sodium, 3 grains (0.2 Gm.)

Sheffield Farms Co., Inc.
Sheffield B. Acidophilus Milk

John Wyeth & Brother, Inc.
Ampoule Solution Dextrose 25 Gm. in 50 cc.
Ampoule Solution Dextrose 50 Gm. in 100 cc.

Yours very truly,

PAUL NICHOLAS LEECH, *Secretary,*
Council on Pharmacy and Chemistry.

CONTRACT PRACTICE AND GROUP HOSPITALIZATION PLANS

March 2, 1934.

Editor, *New England Journal of Medicine,*

I am mailing a letter similar to this one, to my very good friend and correspondent Dr. Olin West of the American Medical Association, in order that its contents may be disseminated throughout the country. Incidentally, I was the first to point out to Dr. West and his Bureau of Legal Medicine that the only proper way to meet the problem of contract practice was by injunction proceedings. This I did one year ago and the success of this method during the year has more than repaid me for writing the letter. There has not been one failure, but an accumulating row of successes.

Not one lawyer in a thousand is versed in medico-legal economics, hence the average legal opinion is not worth much in these matters. I have studiously avoided debate in the matter of group-hospitalization plans, preferring to wait until the affirmative and negative sides had exhausted themselves.

The moment seems opportune to point out that both sides have missed the essential nub of the issue. Here it is.

Any legal opinion to the contrary notwithstanding, no hospital which maintains a staff, which is not completely open to one hundred per cent of the medical profession, organized or unorganized, is a free agent in the matter of disbursing its services, or of entering into contractual relationship with the public as proposed in these various plans. No such contract could stand up in a court of equity for five minutes, and that is exactly the place for which these proponents are heading. Verbum sapienti sufficit.

Yours truly,
JOHN J. HURLEY, M.D.

RECENT DEATH

SWIFT—JOHN BAKER SWIFT, M.D., of 5 Circuit Road, Chestnut Hill, and with offices at 374 Marlborough Street, Boston, died at his home, March 9, 1934.

Dr. Swift was born in 1883, the son of the late Dr. John Baker Swift, who died in 1913, and Mrs. Hettie Porter Swift.

His premedical education was acquired at Noble and Greenough's School, and Harvard College. He graduated in medicine from the Harvard Medical School in 1908, and served an internship at the Boston Lying-In Hospital. He had been visiting physician at the Boston Dispensary. He was a member of the Red Cross Unit which went to Halifax at the time of the explosion when many were killed and injured, and had been an instructor to the Medical Officers training corps. He was a specialist in obstetrics and gynecology.

He is survived by his widow, Mrs. Anna Greenleaf Swift; three daughters, the Misses Martha, Nancy and Jane Swift, and his mother now living in Paris.

Dr. Swift was a Fellow of the Massachusetts Medical Society, the American Medical Association, and a member of several medical and social organizations.

NOTICES

A WARNING TO FELLOWS OF THE MASSACHUSETTS MEDICAL SOCIETY

A rule adopted by the Council of the Massachusetts Medical Society obliges the *New England Journal of Medicine* to drop from its mailing list all Fellows of the Society whose dues remain unpaid on and after March one of each year.

The Treasurer of the Society has sent in the list of deliquent members, and the issue of March 22 will be sent only to those who have paid the annual dues.

Please forward unpaid dues immediately in order to avoid complications.

ANNOUNCEMENT

On Tuesday, March 20, 1934, the centenary of the birth of President Charles W. Eliot will be commemorated at the Harvard Medical School. Professor Walter B. Cannon will deliver a memorial address, "President Eliot's Relations to Medicine." The address will be given in the Amphitheatre of Building C, at 5 P.M.

RADIO HEALTH MESSAGES

MARCH, 1934

Sponsorship: Public Education Committee of the Massachusetts Medical Society and Massachusetts Department of Public Health.

Courtesy WBZ. Fridays, 4:30 P.M.

March

23 How to Keep the Well Child Well

30 Résumé of the Year's Work

HEALTH QUESTION BOX

Sponsored by Massachusetts Department of Public Health. Fridays, 4:40 P.M.

RADIO HEALTH FORUM

Queries from the public are answered under the sponsorship of the Department of Public Health.

Courtesy WEEI. Fridays, 5:00 P.M.

Questions on Health and Prevention of Disease may be sent to Radio Health Forum, State Department of Public Health, State House, Boston.

SPECIAL

Courtesy WEEI. Fridays, 1:15 P.M.

Glimpses into the History of Public Health in Massachusetts together with the Functions and Activities of the Massachusetts Department of Public Health, Blended with Classical Music.

REPORTS AND NOTICES OF MEETINGS

PHYSICIANS' ART SOCIETY

On February 23, 1934, a group of physicians interested in art and artistic craftsmanship met at the Boston Medical Library and organized the Physicians' Art Society of Boston.

A Constitution and By-Laws were adopted and Dr. J. Dellinger Barney was elected President and James F. Ballard Secretary-Treasurer, to hold office until the first regular meeting of the society. Dr. Barney, in accordance with the By-Laws, has appointed a committee on exhibits consisting of the following-named physicians: Drs. L. W. Hill, Eli Romberg, S. H. Sturgis, G. W. Taylor and S. C. Wiggin, and Dr. Barney and James F. Ballard, ex-officiis. This committee met on March 8, and voted to hold an exhibition of the work of members beginning April 23 and continuing through May 5. A smaller exhibition consisting of selections from that of April will be shown during the meeting of the American College of Surgeons which is to be held in Boston during October.

Membership in the society is open to all physicians and dentists of Massachusetts and also to medical students and hospital internes. All persons interested in the society are requested to send in their names and the names of other persons to James F. Ballard at 8 The Fenway.

Full particulars of the exhibitions with rules and regulations will be published at an early date.

BOSTON CITY HOSPITAL HOUSE OFFICERS' ASSOCIATION

The Boston City Hospital House Officers' Association met on Monday, February 12, 1934, at 8:15 P.M. in the Cheever Amphitheatre of the Boston City Hospital, with Dr. G. T. Mullen presiding.

The first speaker was Dr. Fuller Albright of the Massachusetts General Hospital; he discussed "measuring sticks now available in diagnosis, study, and treatment of ovarian disorders". To study a matter scientifically it is necessary to measure it, at least roughly. The ovarian hormones can be measured only by biological tests. For the purpose of this study only estrin and prolan A, the pituitary factor which stimulates the ovary to produce estrin, were considered.

It has been difficult to establish normal standards for the production of estrin because it varies in a 28 day cycle, and because of the age variations. Dr. Albright used the 24 hour urine of two patients with rheumatic fever (otherwise normal women), injecting it into six castrated rats daily for a month; estrin was absent three days in one case, and one day in the other, indicating, he believes, that it is unlikely not to find estrin at any time in the normal 24 hour urine. Using Zondek's method, the test for prolan A was never positive in normal 24 hour urine.

These tests are helpful in distinguishing hypopituitarism from hypo-ovarianism. Thus in the former, repeated tests were negative for both estrin and prolan A, while in a case of hypo-ovarianism the estrin test was negative, and the prolan A test strongly positive — this may represent a compensatory hyperactivity.

The effectiveness of treatment of hypopituitarism with the active substance from the urine of pregnant women can be judged by the test for estrin; if no estrin is produced after several weeks, the treatment is not working. Likewise, if the prolan A test is positive, it is illogical to treat with the above ovary-stimulating hormone; giving estrin seems more logical.

Symptoms of the menopause are probably due to an excess of prolan A, for in all but one of a series of over 30 cases with hot flashes, the prolan A test was positive and the estrin test negative. In several cases followed for a number of months, it was seen that the appearance and disappearance of hot flashes corresponded to the presence or absence of a positive prolan A test. Treatment with large amounts of estrin caused symptoms to disappear in some cases, coincidental with the disappearance of the positive prolan A test.

Dr. Robert C. Cochrane, chief of the second surgical service of the Boston City Hospital, spoke on the surgical treatment of thyroid disorders.

Of the non-toxic diffuse type, the goiter of adolescence needs surgical treatment only if an adenoma develops in it; the simple or endemic goiter needs it only if pressure symptoms develop, or for cosmetic reasons. The non-toxic nodular type, due to enlargement of fetal rests, commonly after the age of thirty, should be removed because of the possibility of toxic or malignant changes.

For toxic diffuse goiter, i.e., Graves' disease, Dr. Cochrane believes surgical treatment to be the quickest, safest, and most satisfactory. Iodine treatment should be used *only* as a preoperative preparation, since many individuals escape from its helpful effects, and its long use tends to make the gland more friable and operation thus more difficult. Iodine can well be used postoperatively to taper off toxic symptoms. The amount of thyroid to be removed can be learned only by experience; if a temporary myxedema should develop, thyroid can be fed, but only under observation and with great care.

Dr. Cochrane believes iodine should be given before operation to all toxic goiter patients, as it helps some and never does any harm. A discrete toxic adenoma may be simply enucleated, but if it is associated with hyperplasia and eye signs, a subtotal thyroidectomy should be performed. A subtotal resection should likewise be done for a toxic nodular goiter of the type which is diagnosed pathologically as colloid adenoma.

Subtotal goiter should be removed whether toxic or not; it may produce all sorts of symptoms, even resembling angina pectoris.

Treatment of the thyroid condition should be carried out without regard for associated diabetes or other glycosuria, since they usually improve after operation.

Malignancies which have broken through the capsule cannot be treated surgically, except to resect the isthmus when it is pressing on the trachea.

Acute thyroiditis is best treated by wide drainage; chronic thyroiditis, by hot and cold applications, and the x-ray.

A non-toxic adenoma should be removed if it causes symptoms (other than those associated with a change in the basal metabolic rate); in one case such an operation caused the patient to feel much better, and was followed by the healing of a tibial fracture which had failed to unite for many months.

In heart disease, removal of a toxic goiter may make the patient a useful individual again. Removal of the thyroid, even when there is no pathology in it, has helped in some cases of congestive failure, although as yet the rationale is not known.

Dr. Allan Winter Rowe, chief of the Evans Memorial Hospital, discussed endocrine disorders, with special reference to studies he has made of cases of pituitary pathology. Pituitary disorders vary from the true acromegalic, with active hyperpituitarism; (1) to the cases of congenital or early pituitary failure; (2) two intermediate groups are also distinguished. Twelve skulls studied have shown changes corresponding to these groups: (1) large frontal sinuses, large jaw, diploic expansion; (2) similar, but sclerosis has begun under the designation of "abortive acromegalic"; (3) lack of hyperpneumatization, and sclerosis more pronounced; (4) hypopneumatization, thin diploe. The picture of type (4) is found in Simmond's disease, and in midgets, who have a good mentality.

Measurements on the basal metabolic rate were made on a number of dwarfs and acromegalics; it was found that the oxygen used, and calories per hour, were proportional to the size of the individual tested. A congenital luetic dwarf did not fit into this series. The normal standards of six different workers, based on age, sex, and weight, or weight-height, or surface area, were compared with these results, and it was found that they were not strictly applicable. This may have been partly because dwarfs are children in size and sex, and adults in age, but it is felt that there is a definitely lowered basal metabolic rate associated with hypopituitarism.

Studies were made of the sitting height index in the same cases, and compared with the values Dreyer found for normals. This ratio of weight to sitting height was found to be diminished in hyperpituitarism, and increased in dwarfs of type 4. This value was also increased in several achondroplastic dwarfs, but they showed no other evidences of pituitary involvement; of a great many laboratory tests on them, all were normal, with the exception of a diminished galactose tolerance.

Dr. Joseph C. Aub of the Huntington Memorial Hospital spoke on recent advances in knowledge of the hormones of the anterior pituitary. Tumors of the acidophile cells produce gigantism or acromegaly. Microscopic adenomata of the basophile cells are associated with increased blood pressure, obesity, very thin bones, absent menstruation, and some-

times diabetes. Either of these groups, or the chromophobe cells may produce any picture by pressure on functional cells.

The pituitary is intimately related to other glands of internal secretion. Its removal in rats causes atrophy of the thyroid, thin bones with blood calcium change (effect on parathyroid?), and thinning of the adrenal cortex; the stimulating effect of the pituitary on the ovary is well known. That the pituitary has somewhat of an antagonistic action to the interstitial cells of the pancreas is shown by the high surgar curve of acromegaly, the low sugar curve of hypopituitarism, and experiments on dogs. Removal of both pancreas and pituitary causes but a mild diabetes, but injection of pituitrin in such an animal makes the diabetes very severe. At least eight active principles have been isolated, by means of which the pituitary tends to link together all the glands of internal secretion.

It is being questioned whether the Froelich syndrome is due entirely to pituitary deficiency, or whether a lesion in the tuber cinereum just posterior to the gland is responsible for the obesity, as seems to be the case in rats. Another type of case is the Simmond's cachexia, which is similar but never associated with diabetes insipidus or obesity. A third type is the microscopic basophile adenoma of Cushing, of which increased blood pressure and red striae on the abdomen are signs.

HARVARD MEDICAL SOCIETY

The bimonthly meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on February 13, 1934. Dr. John L. Morse presided. Two cases were first presented. The first patient was a six and one-half year old boy who had entered the Children's Hospital with the chief complaints of muscular rigidity and convulsive seizures during the four days before admission. A diagnosis of tetanus was made. Examination of the thoracic spine had shown a slight kyphos and x-ray films showed fresh compression fractures of the fourth, fifth, sixth, and seventh dorsal vertebrae. The cause of these was believed to have been the muscle spasm of the disease. The patient was treated with antitetanic serum and quieted with amytal. Later he was placed on a Bradford frame for two and a half months and now he walks about in a plaster jacket. A number of cases similar to this have been reported in the European literature.

The second patient was an elderly man with chronic renal insufficiency. The patient's blood sodium and blood chloride had each dropped to below normal, while the non-protein nitrogen had remained constant, during a period of hospitalization and observation. This was made the subject of a brief paper by Dr. A. M. Butler on the mechanism of salt deficit in chronic nephritis. If the kidney functions by glomerular filtration and tubular reabsorption the renal insufficiency that causes retention of substances of low serum concentration causes lowering of the concentration of substances of high serum concentration. The data presented showed that, if the urine volume was sufficient to provide for maximum nitrogen excretion, the ability of the kidney to reabsorb sodium and chloride was exceeded. The patient should of course be limited in his protein intake (the N.P.N. was high) but not limited in his salt intake. Determination of optimal fluid intake demands further study. In cases where there is a low serum protein, low non-protein nitrogen, and concentrated urine a high protein diet is indicated and the salt intake should be limited in order to help avoid edema. In discussing the case Dr. Gamble emphasized the regulatory function of the kidney in addition to its excretory one.

The second paper of the evening was presented by Dr. L. D. Fothergill, on "The Specific Treatment of Influenzal Meningitis." The disease was first defined as that form of meningitis caused by the so-called bacillus influenza, which organism may or may not cause the typical epidemic influenza. The virulence of the organism and its antigenic composition and immunological properties have been the special problems studied. The importance of the disease is seen from the fact that this organism is the cause of about 20 per cent of the cases of non-tuberculous meningitis. The malady is one of young children and infants, 85 per cent of the cases occurring between the ages of two months and two and a half years. The bactericidal power of human blood has been found to follow a curve proportional to this in that this age group has the least bacterial resistance. The disease usually localizes in the meninges following an acute upper respiratory infection and bacteremia. Immunologically speaking, there are one or two serological groups, and all the meningitic strains of the Pfeiffer bacillus are virulent ("smooth" colonies, and having the "specific soluble substance") and this is of aid in the production of suitable serum from horses. Complement must be used with the serum given intraspinally for the medication to be effective. Seventy-five patients have been treated. Of these, nine have recovered, which apparently shows the value of the serum in this hitherto practically hopeless disease. Another group of patients received no benefit at all from the serum, and the third group showed some temporary improvement, with subsequent relapse. In the last group, at postmortem examination, localized, walled-off lesions have been usually found at the base of the brain. In response to questions at the end, Dr. Fothergill added that normal adult serum has not been shown to have a high enough immunity titer to be of any use. Standardization of the serum has not yet been perfected, chiefly because it is difficult to establish the titer of a bactericidal serum and, then again, animals are not very susceptible to the disease.

Dr. L. K. Diamond was the final speaker on the program, with the subject "Some Experiments in

Iron Metabolism." It had been found at the Thorndike Laboratory at the Boston City Hospital in previous work that the presence in a collodion membrane of tertiary phosphates prevented the dialysis of iron and ammonium citrate. Hence it was wondered if the presence of iron interfered with phosphate absorption in the gastro-intestinal tracts of animals, or vice versa. It was proved that this was the case. When ferric chloride was added to a diet adequate to prevent rickets without the addition, rickets was produced (rats). Other iron salts, including iron and ammonium citrate also produced rickets in rats in the same way. The presence of both iron and phosphorus in the gastro-intestinal tract at the same time thus inhibited mutual absorption. The addition of vitamin D to the diet hastened the absorption of phosphates and thus tended to prevent rickets even in the presence of iron. Dr. Diamond believes that the ordinary iron intake is not sufficient to cause rickets in human beings by this action, but the possibility of it impairing phosphate intake, or of phosphates interfering with iron absorption must be always borne in mind. Anemic rats were not relieved of their condition by the addition of iron in small amounts to milk in their diet. Iron in excess and iron without milk were efficacious, however, in restoring the normal blood condition.

NEW ENGLAND PHYSICAL THERAPY SOCIETY

The regular meeting of the New England Physical Therapy Society will be held in the Banquet Hall of the Hotel Victoria, 271 Dartmouth Street, Boston, at eight o'clock in the evening of March 21, 1934.

The program is in charge of Dr. George B. Rice.

PROGRAM

Subject: Nose and Throat Conditions.

Topics:

1. The Faucial Tonsil — Anatomy, Physiology, Pathology and Various Methods of Removal. (Illustrated.)
2. Hyperesthetic Rhinitis and Its Successful Treatment with Diathermy. George B. Rice, M.D., Boston.

Discussion will be opened by Leighton F. Johnson, M.D., Boston; Wilmot L. Marden, M.D., Lynn.

Dr. Rice will show some very interesting reflectoscope illustrations of diseased tonsils seen in his own practice.

Council Meeting at six; Round Table Dinner at six-thirty.

All members of the medical profession are cordially invited to attend and to participate in the discussion.

ARTHUR H. RING, M.D., *Secretary.*

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held in the Evans Auditorium of the Massachusetts Memorial Hospitals, Monday, March 26, at 8:15 P.M.

All members of the New England Heart Association and interested physicians are invited to attend.

PAUL W. EMERSON, M.D., *Secretary.*

BOSTON MEDICAL HISTORY CLUB

Sprague Hall, 8 The Fenway
Monday, March 19, at 8:15 P.M.

"Jacob Zahalon — Rabbi Physician." Harry A. Savitz, M.D.

"The Solomon M. Hyams Collection of Hebrew Medical Literature." James F. Ballard.

Exhibition of books and manuscripts.

JAMES F. BALLARD, *Secretary.*

THE MALDEN MEDICAL SOCIETY

The next meeting will be held on March 20, 1934, at Malden Electric Co. Hall, at 8:30 P.M.

Speaker: Charles F. Painter, M.D., Librarian, Boston Medical Library.

Subject: "Some Interesting Facts in Medical History."

A. H. WARREN, M.D., *Secretary.*

NEW ENGLAND PEDIATRIC SOCIETY

The next meeting of the New England Pediatric Society will be held in Boston, Friday, March 23, 1934.

4:15 P.M.—Clinical Program. Children's Hospital, Longwood Avenue, Boston.

6:45 P.M.—Dinner. Vanderbilt Hall, Harvard Medical School.

EVENING PROGRAM

Boston Medical Library—8:15 P.M.

1. Present Knowledge of the Food Substances—Dr. James L. Gamble.
2. Factors Influencing the Viability of Premature Infants—Dr. Stewart Clifford.
3. Discussion of Dr. Clifford's paper by
   a. Dr. Frederick C. Irving.
   b. Dr. Kenneth Blackfan.
   c. Dr. Warren Sisson.
   d. Dr. Richard S. Eustis.
4. Refreshments.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

March 16—New England Roentgen Ray Society will meet at the Boston Art Club, Boston, at 8 P.M. (Round Table Conference). Dinner at 6:30 P.M. for $1.00 a plate.

March 16—Cutter Lecture on Preventive Medicine, to be given by Karl Landsteiner, at the Harvard Medical School, Amphitheatre Building E, 5 P.M.

March 19—Boston Medical History Club. See notice above.

March 20—Centenary of the birth of President Charles W. Eliot. See page 608.

March 20—The Malden Medical Society. See notice above.

March 20—South End Medical Club will meet at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, at 12 noon.

March 21—New England Physical Therapy Society. See notice elsewhere on this page.

March 23—New England Pediatric Society. See notice above.

March 26—New England Heart Association. See page 611.

April 13, 20 and 27—Salmon Memorial Lectures. See page 443, issue of February 22.

April 16—Boston University School of Medicine to Conduct a Clinical Meeting at Boston City Hospital.

April 16-20—The American College of Physicians will hold its Eighteenth Annual Clinical Session in Chicago at the Palmer House. For information write Mr. E. R. Loveland, Executive Secretary, 133-135 South 36th Street, Philadelphia, Pa.

April 30—The American Board of Dermatology and Syphilology. Examinations for Certificates. Address: Dr. C. Guy Lane, 416 Marlboro Street, Boston, for details.

July 24-31—The IVth International Congress of Radiology will be held in Zurich under the presidency of Professor H. R. Schniz. General Secretary Dr. H. E. Walther, Gloriastrasse 14, Zurich.

September 3-6—American Public Health Association, at Pasadena, California. Dr. J. D. Dunshee, Chairman, Local Committee on Arrangements.

September 4, 5, 6—International Union Against Tuberculosis will be held in Warsaw. For particulars address The National Tuberculosis Association, 450 Seventh Avenue, New York, N. Y.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

Wednesday, April 4—Essex Sanatorium, Middleton. Clinic 5 P.M. Dinner 7 P.M. Speakers: Dr. Elliott P. Joslin and Dr. Howard F. Root, Boston. Subject: "Tuberculosis Complicating Diabetes."

Thursday, May 3—Censors' Meeting, at Salem Hospital, 3:30 P.M.

Tuesday, May 8—Annual Meeting. Salem Country Club, Forrest Street, Peabody. Dinner at 7. Speaker to be announced. Subject to be announced.

RALPH E. STONE, M.D., Secretary.
221 Cabot Street, Beverly, Mass.

FRANKLIN DISTRICT MEDICAL SOCIETY

The next meeting will be held on the second Tuesday of May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D., Secretary.
Sunderland, Mass.

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

The next meeting will take place in May (2nd Wednesday) at Winchester.

ALLAN R. CUNNINGHAM, M.D., Secretary.
76 Church Street, Winchester, Mass.

MIDDLESEX NORTH DISTRICT MEDICAL SOCIETY

Meeting will be held on April 25.

T. A. STAMAS, M.D., Secretary.
226 Central Street, Lowell, Mass.

NORFOLK DISTRICT MEDICAL SOCIETY

March 27—Faulkner Hospital, 8:30 P.M. Dr. Henry H. Faxon and Dr. Edward A. Edwards: Symposium on "Varicose Veins." Discussion by Dr. E. E. O'Neil.

April 17—Hotel Kenmore, 8:30 P.M. Special Business Meeting.

May—Annual Meeting. Time, place and program to be announced.

FRANK S. CRUICKSHANK, M.D., Secretary.
1695 Beacon Street, Brookline, Mass.

NORFOLK SOUTH DISTRICT MEDICAL SOCIETY

April 5—12 noon at Norfolk County Hospital. Speaker: Dr. Elliott P. Joslin. Subject: Diabetes.

May 3—12 noon at Norfolk County Hospital. Annual Meeting. Election of Officers.

N. R. PILLSBURY, M.D., Secretary.
Norfolk County Hospital, South Braintree, Mass.

SUFFOLK DISTRICT MEDICAL SOCIETY

March 28—Clinical Meeting at the Massachusetts Memorial Hospitals.

April 25—Annual Meeting at the Boston Medical Library. Election of Officers. Scientific Program, titles and speakers to be announced.

The Medical Profession is cordially invited to attend these meetings.

JAMES H. MEANS, M.D., Vice-President.
GEORGE P. REYNOLDS, M.D., Secretary,
311 Beacon Street, Boston, Mass.

WORCESTER DISTRICT MEDICAL SOCIETY

All meetings to be held on Wednesdays as follows:

April 11—Open date.

May 9—Annual Meeting. Time and place to be announced later.

ERWIN C. MILLER, M.D., Secretary.
27 Elm Street, Worcester, Mass.

BOOK REVIEWS

The Renaissance of Medicine in Italy. By ARTURO CASTIGLIONI. Publications of the Institute of the History of Medicine, The Johns Hopkins University, Third Series, Volume I. The Hideyo Noguchi Lectures. Baltimore: The Johns Hopkins Press, 1934. xiv + 91 pages. Price, $1.50.

Dr. Castiglioni, who is professor of the History of Medicine at the University of Padua, where so much of Italian medical history was made in the past, has given a delightful and brief account of Italy and its medical worthies during the period of the Renaissance. No one is better able to summarize the situation than the extraordinary author of this book. As depicted in a most entertaining introduction by Professor Sigerist of Johns Hopkins University, we learn that Castiglioni, a graduate of the University of Vienna, has been head of the sanitary service of the Lloyd Navigation Company, with headquarters at Trieste, for a period of over thirty years. While carrying on this routine medical work, he became interested in the history of medicine and, after the War, went to Vienna again, where he studied with Max Neuburger. He soon became Neuburger's foremost pupil. Returning to Trieste and his old position, which he still carries on in a most efficient manner, he was appointed professor of the History of Medicine at the University of Padua. Here he lectures occasionally to a roomful of eager students, for no one could be more popular in a university town than this eminent man. He has also given courses in the history of Italian science at the University of Foreigners in Perugia. His *History of Medicine*, published in both Italian and French editions in 1931, is one of the outstanding contributions to the subject of our time. A smaller book on *Italian Medicine*, in English, was published in New York, two years ago. The work of Castiglioni illustrates in a way seldom seen in this country how a routine administrative post may be glorified by attaching to it an intellectual diversion such as the history of medicine.

Alcohol: Its Effects on Man. By HAVEN EMERSON. New York and London: D. Appleton Co., 1934. x + 114 pages. Price, $1.00.

It is rather surprising to read in the preface of this book that all but two of the states (Arizona and Wyoming) have laws requiring the teaching of the effects of alcohol and other narcotics upon the

human system in all schools supported wholly or in part by public funds. Such courses are required for children after the third year of grammar school and before the second year of high school. This book has been written to provide school teachers and students, therefore, with the facts regarding the action and effects of alcohol on man as they are now known to the medical sciences. Dr. Emerson, who is professor of Public Health Practice in Columbia University and widely known as a teacher, extracted briefly from the large volume of literature on the subject all that is important in regard to the use of alcohol in its various forms. Without being critical of the moral issue, he has simply stated the facts in a manner which no one can question. He has left the ultimate decision to the reader, but, at the same time, has equipped him with an intelligent understanding of both the advantages and the dangers of alcohol. The book can be most highly recommended.

Addenda to a Bibliography of the Honourable Robert Boyle. By J. F. FULTON. Oxford Bibliographical Society Proceedings and Papers, Volume III, Part 3, pp. 339-365. (1933.)

The original bibliography of Robert Boyle was reviewed in the *New England Journal of Medicine*, June 2, 1932. At that time it was pointed out that Boyle was a most difficult subject for bibliography as so many of his works were reprinted in various editions and issues that it was almost impossible to make a complete collection of his works. Professor Fulton suggested, at the time of the publication of his book, that additional notes might be needed and now these additions have come to hand, published with the same care and thoughtfulness which made the bibliography such an important contribution to medical history.

Professor Fulton has done more to humanize bibliography in this country than anyone else and his work is not unlike that of Geoffrey Keynes, also a physician, in England. Those interested in this subject should note Dr. Keynes' review of Professor Fulton's book in the *Bodleian Quarterly Record*, Volume 7, No. 76, 1932, and particularly Fulton's paper on "Haller and the Humanization of Bibliography", given as the annual oration of the Boston Medical Library and published in this *Journal* for February 18, 1932.

Pathogenic Microörganisms. By WILLIAM HALLOCK PARK and ANN WESSELS WILLIAMS. Published by Lea and Febiger, 1933. 867 Pages. Price, $7.00.

The tenth edition of this standard work by Park and Williams brings it well up-to-date. A large part of its popularity may be explained by the emphasis on useful laboratory methods. The vast experience of the authors enables them to speak authoritatively on all angles having importance from the public health standpoint.

The book is divided into three parts: The principles of microbiology, including the general methods in use for obtaining, isolating and classifying microörganisms, together with a discussion of the various phases of immunity. The second part deals with a systematic description and classification of the bacteria, including the filtrable viruses and the pathogenic protozoa. Part three covers the applications of the various bacteriological procedures, particularly in relationship to the examination of air, water, milk, shellfish and soil. A very useful section is the last chapter, that on practical disinfection and sterilization. The chapter on pneumococci is particularly helpful, including a discussion of the newer types and the most satisfactory methods of typing.

This edition of this standard bacteriological textbook should continue the well-merited popularity of the volume.

The Teaching of Preventive Medicine in Europe. University of London Heath Clark Lectures 1932. By CARL PRAUSNITZ, M.D., etc., Professor of Hygiene in the University of Breslau. Oxford University Press. London: Humphrey Milford. 1933. 180 Pages.

Of these twelve lectures, the first surveys the field of preventive medicine and indicates the development in the present century of public health work as a function of the state in all enlightened countries. In the remaining lectures is described for each country of Europe the plan of organization under the Ministry of Public Health and the system of education for sanitary officers and public health workers. All who are interested in methods of health administration will do well to read this book in detail. To the more general reader it is impressive to note the rapid establishment everywhere of Institutes and Schools of Hygiene and the activity with which all Europe, including the League of Nations, is striving to extend the application of preventive medicine.

A Diabetic Manual. By ELLIOTT P. JOSLIN, M.D. Published by Lea and Febiger, Phila. Fifth Edition, 1934. 220 Pages. Price $2.00.

A request for a revision of this standard manual in 1933 indicates that the depression has not destroyed the demand for practical medical publications. The author has condensed a tremendous amount of useful instruction for patient and physician in a small volume, and written into its pages sympathetic understanding of the human problems of the diabetic. In addition to dietary and insulin instruction, sections are devoted to special topics such as the inheritance of diabetes, marriage of diabetics, surgical complications and diabetic children. New tables, which formed a part of the prize-winning exhibit at the Milwaukee meeting of the American Medical Association in June 1933, emphasize methods to be employed in the future for the prevention of diabetes and its complications.

Physiological Health. Edited by Jay B. Nash. Published by A. S. Barnes and Company. 308 Pages. Price $2.00.

This is the fourth volume of a series published by the school of education in New York University entitled "Interpretations of Physical Education."

It is a text for teachers of physical education in the schools. This little book is comprehensive in its scope and is, as is to be expected in a book in which chapters are written by different individuals, very uneven. The current theories, both psychological and physiological, are utilized to the utmost during the development of what should be the ideal child. These theories are sometimes stretched beyond their utmost, and at times are somewhat contradictory.

In general the book appears valuable for the purpose for which it is intended, but is of little or no value to physicians.

Studies from The Rockefeller Institute for Medical Research. Reprints, Volume 86. Published by the Rockefeller Institute for Medical Research. 1933. 621 Pages.

Several articles of unusual interest to physicians are included in the varied range of subjects of this report. Of particular interest with regard to the understanding of allergic cutaneous manifestations is the article "Demonstration of Lymphatics in the Human Skin" by Hudack and McMaster. Claude and Murphy contributed an excellent review of transmissible tumors of the fowl. To those interested in arthritis, Vaubel's report on the synovial cells in tissue culture will be of much interest.

Neuroanatomy. By J. H. Globus. Baltimore: William Wood & Co., 1934. xv + 240 pages. Price, $3.50.

This volume, now in its sixth edition, was first issued in 1915. It has had a well-deserved success as a laboratory textbook and has found wide use in various medical schools in this country. The new edition has relatively few changes except in details. The material is still divided into two parts, one descriptive and the other instructions to the students as to how to make observations. The last half of the book consists of semi-complete illustrations, which may be removed by the student and completed at the time of his observation of the specimen. These plates can later be reinserted in the volume. By this ingenious device the book is greatly increased in value as a laboratory manual.

Curing Our Nerves. By Marshall Morgan Cloud. Pasadena News Syndicate, 1934. 206 Pages.

This book, written in a semi-popular style, is a rather personal account of the author's experiences in handling psychoneurotic patients. It is filled with many observations of a more general nature, not all of which play any distinct part in the care of people with nervous disease. Although the text is of some value, the book is poorly printed and badly issued. The reviewer does not feel that it will serve any useful purpose, in view of the fact that there are many much better publications of this type available.

Annual Report 1932. The Rockefeller Foundation. Published by The Rockefeller Foundation. 402 Pages.

One of the most cheering features of this report is to read that in these dark days the assets of the Rockefeller Foundation total $205,192,479.11.

The five divisions of the Foundation report their work for 1932. The International Health Division reports on the control of yellow fever, malaria, hookworm, and the common cold, as well as other important diseases. During the year it spent nearly two and one-half million dollars aiding public health work in this country, twenty-two European countries and seven regions of the East.

The outstanding contribution of the division of Medical Sciences was the establishment and endowment of the Neurological Institute, headed by Wilder Penfield, at McGill University.

The divisions of Natural Sciences, Social Sciences and Humanities are not touched on in this brief review, the report of those divisions being of less immediate interest to the medical profession.

History of Urology. Volumes I and II. Published by Williams & Wilkins Company, Baltimore. Price, $8.00 for both volumes. Prepared under the auspices of the American Urological Association.

The history of urology is written in two volumes. The first half of volume one is devoted to the history of urology in various medical centers throughout the country. It is interesting to note that "the American Urological Association was born of poor but honest parentage in a humble wine house in New York on Washington's birthday, February 12, 1902".

The last half of the first volume and volume two deal comprehensively with the genito-urinary diseases, their history, and American urologists' contributions to the understanding of these various diseases. It is extremely well done and is unique since it is the first attempt to record collectively the work of Americans in the field of urology. In this respect it is comparable to the French Encyclopedia of Urology.

At the end of each chapter a vast bibliography is appended dealing with the urologic condition discussed. These volumes should equally appeal to the gynecologist, pathologist, internist, and to all individuals interested in the history of American medicine.